

# COMPUTERWORLD

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## 3790 Joins IBM Family

The IBM 3790 communications system supports 3277 CRTs, 3793 Selectric-type keyboard printers and the 3791 controller (left, shown as a design model). The 3790 communicates with 370 mainframes over dial-up or private lines at speeds up to 2,400 bit/sec. The 3791 controller transmits to a 3704 or 3705 using SDLC. Story on Page 27

## Bell Loses Court Fight, Must Supply Lines to MCI

By Ronald A. Frank  
Of the CW Staff

PHILADELPHIA — AT&T was handed a stunning defeat in U.S. District Court last week when Judge Clarence Newcomer ruled that AT&T must supply disputed interconnection facilities to MCI Telecommunications Corp.

The court action prohibits AT&T from any further delay in supplying facilities to MCI that will allow the specialized carrier to initiate service to many of its customers. But AT&T may refuse to comply pending further legal action.

In granting MCI injunctive relief, the court ruled that all Bell System operating companies must immediately provide MCI with interconnection for its network on a basis equal to the facilities provided to AT&T Long Lines Division.

Reacting to the ruling, an AT&T spokesman said, "We are disappointed that the court found any merit at all in the de-

mand for the type of interconnection which is so clearly contrary to the public interest. It appears the ruling is an attempt to make a would-be competitor a partner in the joint provision of telecommunications services."

The ruling marks a "radical departure" and "certainly warrants a full public hearing before the Federal Communications Commission which already has the subject before it in an official proceeding," the spokesman said.

Bell is expected to "immediately appeal the order," the spokesman said, adding that operating companies were not beginning to provide the services ordered by the court, because AT&T lawyers will probably request a stay of the court order, pending a study of the ruling.

If AT&T decides to comply with the court's findings, its companies will have to begin supplying local loops, common

(Continued on Page 6)

## Era Ends at IBM — Watson to Step Down

By E. Drake Lundell Jr.  
Of the CW Staff

ARMONK, N.Y. — An age is passing in the computer industry.

At the end of this month there will no longer be a Watson involved in the day-to-day operations of IBM, which probably more than any other large American corporation has been dominated and molded by one family.

On Jan. 31, Thomas J. Watson Jr. will step down from active participation in the daily operations of the firm his father joined as general manager almost exactly

### U.S. Trust Plan Set

The government has released a statement of the issues it plans to raise when its antitrust suit against IBM comes to trial later this year. As expected, much attention will be focused on market definition and alleged price controls. Page 2

60 years ago.

Together the two Watsons — father and son each in his own way — built what is undoubtedly the most successful American corporation of the 20th century,

Related story on Page 41

spawning two new revolutionary industries in their time and changing Americans' concepts of doing business.

Watson's retirement from the three-man Corporate Office that rules the firm, is dictated by the policy begun by T. Vincent Learson last December of retirement at age 60 for top executives. Watson will be 60 on Jan. 8, 1974. He will remain as a director, however, and will be on the board's executive committee.

In the Beginning

The Computing-Tabulating-Recording  
(Continued on Page 2)

## IBM Extends 2260 Support To 370 Data Base Users

By Ronald A. Frank  
Of the CW Staff

NASHUA, N.H. — Users of IBM 2260 and 2265 CRTs and equivalent non-IBM displays received a Christmas present recently when the company announced it would provide broader terminal software support for its virtual data base management systems.

Originally IBM had informed customers that users who planned to upgrade to virtual 370s would be limited to 3270 displays if they wanted to utilize virtual storage versions of CICS and IMS.

But IBM reversed this position apparently due to efforts by Sanders Data Systems here.

"Based on possible violations of anti-trust laws, IBM has agreed to reverse a policy that would have caused many . . . customers undue expense to gain the benefits of advanced computer technologies," a Sanders spokesman said.

But an IBM spokesman disagreed, saying the support was being provided "in response to customer requests."

Admitting it will extend its software support to the 2260s and 2265s, an IBM spokesman said the support would include Model 1 and 2 of the 2260 and Model 1 of the 2265. According to

Sanders, IBM will provide device support for 2260s operating under CICS/OS/VS, CICS/DOS/VS and IMS/VS program products in October 1974.

Also, applications programs using 2260 device support under IBM's CICS/DOS Entry, CICS/DOS Standard, CICS/OS Standard V2 and IMS/360 Version 2 need no modification, Sanders said.

The added IBM software support will affect users of Sanders 620, 720 and 800 series displays and will allow them to keep their systems when upgrading from 360s to virtual 370s, Sanders said.

Users of 2260 equivalents from other non-IBM suppliers will also be affected by the announcement. A spokesman for Courier Terminal Systems, Inc. said: "We have no idea what prompted the [IBM] decision. We would guess customer demand but we don't know that."

With continued terminal software support, users will not have to undertake extensive reconfiguration of their teleprocessing and software systems when upgrading to a virtual storage environment.

"We felt that in fairness to our customers, . . . IBM could not withdraw 2260 support," a Sanders spokesman

(Continued on Page 2)

## Home Terminal Plan Cancelled

### 'In-Touch' out of Touch

By Robert L. Glass  
Special to Computerworld

SEATTLE, Wash. — In-Touch, a service that turned any 12-key Touch-Tone telephone into a computer terminal [CW, July 11], has been dropped by the Seattle-First National Bank.

Simple economics was the downfall of the home-oriented time-sharing system. Four hundred users signed up last June when the service started. Only 300 customers remained at the end.

"We were ahead of our time," said Joseph W. Gelzer Jr., president and co-

founder of Telephone Computing Service, Inc., a subsidiary of the bank. "We were the first of our kind in the nation. You might say it doesn't pay to be first."

By placing a special template over the pushbutton phone face, the service allowed homeowners to key in instructions to pay bills, to use the phone as a calculator, or to store tax or other personal data. Subscribers were charged \$6.50 per month for 100 minutes of connect time.

However, Touch-Tone phones are not yet commonly used in Seattle (they cost \$1.50 extra per month) and users seemed to have trouble learning how to get the system to do what they wanted, Gelzer said.

Most (75%) of those who did sign up for the service remained loyal to it. Automated bill-paying was the most popular capability of the system; 50 merchants contracted with TCS to permit payment

(Continued on Page 2)



Thomas J. Watson Jr.

### On the Inside

People Are Sticking Point  
In Systems Testing —Page 5

ACL, Flexible I/O  
Add Power to 3740 —Page 19

Communications . . . . .23  
Computer/Industry . . . . .41  
Editorial . . . . .16  
Financial . . . . .54  
Societies . . . . .35  
Software/Services . . . . .19  
Systems/Peripherals . . . . .27



# Government to Rely on IBM Papers in Antitrust Case

By E. Drake Lundell Jr.  
Of the CW Staff

NEW YORK — The government has clearly outlined the major issues it wants decided in its antitrust case with IBM in a "preliminary statement of triable issues" released recently.

The document indicated that the government, much like Telex in its suit against IBM, would rely heavily on internal IBM documents for much of its case.

For example, on the issue of the definition of the market against which to measure IBM's position, the Department of Justice asked the court to determine whether IBM's own records before the government filed suit would "provide an appropriate measurement of the universe or denominator of such market."

In addition, the document asks the court to determine "whether IBM effected changes in its market measurement policies and practices on or about the time of the filing of the complaint and if

so whether such changes show or tend to show IBM's knowledge that its prior market measurement policies and practices revealed that it possessed a monopoly share in any relevant markets or submarkets."

In addition to the question of market definition, the government lists six other areas it expects the trial to consider.

After the appropriate market has been defined, always a turning point in antitrust cases, the government asks the court to use the trial to determine "whether IBM's share of the relevant markets characterizes those markets as monopolized markets."

The document also asks "whether the sustained high level of profitability by IBM during a period of substantial growth of the relevant markets, accompanied by an absence of significant entry and the exit of two of the leading industrial enterprises in the U.S., GE and RCA, characterizes the relevant markets as monopolized markets."

## Price Controls?

Another factor to be examined in the trial, according to the document, is "whether IBM's ability to price its products substantially higher than the comparable products of its competitors... shows or tends to show its control over price, its power to exclude competitors and thereby, its monopoly power."

In the area of intent to monopolize, the government said the court should determine "whether such intent is evidenced in part by IBM's marketing practices" and whether such an intent was shown in statements of IBM officials and employees "including those disclosed in IBM documents."

The court is also being asked to determine if IBM "in furtherance of its attempt to monopolize" engaged in bundling practices "for the purpose or with the effect of discouraging or forestalling the growth or entry of competitors."

The government also asks the court to determine if IBM used bundling in an effort "to price discriminate among its customers or potential customers" and to inhibit the growth of independent competitors in the computer support field.

The statement of issues also raises the subject of "fighting machines" or equipment that was designed solely to destroy or inhibit competition.

The statement asks the court to determine "whether IBM... restrained or attempted to restrain competitors from entering, remaining or expanding in one or more of the relevant markets by announcing and introducing selected computer products with unusually low profit expectations in those markets or segments of the markets where the competitive success of such competitors affected or appeared likely to affect IBM's monopoly position in one or more of the relevant markets."

As part of this issue, the government document asks the court to determine if IBM moved up "announcement dates of various computer products, when in fact, such products were not tested or announced in conformance with IBM's established procedures on product announcement and marketing."

In addition, the document asks the

court to determine whether IBM, in an attempt to monopolize, "misrepresented to customers or potential customers the characteristics, delivery dates, capabilities, and/or specifications of new or modified... computer products for the purpose of or with the effect of hindering competition."

In the area of leasing, the court will have to determine if IBM manipulated lease and purchase prices to make leasing more attractive and denied or threatened to deny service to customers who used non-IBM memory units, the statement said, along with several other issues in the leasing field.

The statement also asks whether IBM created "a lease-oriented environment so as to raise the barriers to entry or expansion in such markets by any competitor or potential competitor by creating extreme capital requirements."

The statement also asked the court to determine if IBM, in an attempt to monopolize the market, granted "exceptional discriminatory allowances and

other considerations to educational and scientific institutions" so as to maintain those prestige accounts and assure that graduates of educational institutions were familiar with IBM equipment.

The statement of issues, as its name implies, states all of the issues the government expects to arise during the trial of the case and this is the second one issued by the government.

However, it is little changed from the one issued over a year ago, indicating there has been little change in the government's feeling about the important issues in the case in spite of all of the pretrial activity, which is supposed to help the parties limit the issues at the trial.

While all of the issues are stated in a "whether or not" form, indicating the judge will have to ultimately decide whether or not IBM engaged in the stated practices, the document is basically the government's detailed indictment of the firm, outlining the practices it feels add up to a monopoly position under the Sherman Antitrust Act.

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## Watson to Step Down at IBM

(Continued from Page 1)

Co. that Thomas J. Watson Sr. joined in 1914 was a far cry from the enormously successful IBM of today.

The senior Watson, a one-time piano salesman from upstate New York, joined the firm under an antitrust cloud — and ironically his son is leaving just as the firm is facing its stiffest antitrust case in history.

Watson Sr., when he joined C-T-R, had been convicted of monopolistic practices for his work at National Cash Register, where he had been sales manager and at one time had headed up that firm's anti-competition division.

The C-T-R Watson Sr. joined was a true product of the age — a trust that owned several different companies ranging from weighing machines to time clocks.

But it was a firm with a time bomb hidden within it that would revolutionize American business and life.

The bomb was the Hollerith machine named after its inventor Herman Hollerith, since the firm he had established to sell such devices was one of the firms caught up in the C-T-R trust.

Watson Sr. seized on the tabulating machine and it became the centerpiece of C-T-R, which was renamed International Business Machines Corp. in 1924.

By the Thirties IBM had the punched card tabulating machine market almost exclusively to itself having driven most of the competitors from the field through brilliant engineering and marketing practices.

The IBM dominance was quickly recognized by the government and IBM lost an antitrust suit in 1933 — and entered a consent decree with the government that was an effort to reduce its dominance in the market.

But the dominance remained, and the government again took the firm to court

## D P Offered for Carpool

ALBANY, N.Y. — The state Department of Transportation here is offering computer assistance to local governments who want to institute computerized carpool plans.

According to commissioner Raymond T. Schuler, the plan is designed to conserve fuel by encouraging more commuters to use carpools or mass transit to get to work.

Under the plan workers will receive maps on which they identify their residences and work areas. The computer system will try to match them with other commuters who travel the same routes or will identify the best mass transit possibilities for those workers.

The program is reportedly based on a similar one in use here involving state workers. That program has gotten 3,000 participants in just two weeks.

in the waning days of the Truman Administration — just at the time the computer was coming on the scene as a commercial reality.

But Watson Sr., steeped throughout his life in antitrust actions, did not want to give in.

He relinquished control of the firm to his son and namesake — some say in order to avoid signing the consent decree with the government that was almost inevitable.

Watson Jr. took over in 1956 and quickly settled the antitrust action that year with the out-of-court agreement.

Watson Jr. made all the tough decisions that enabled the company to make computer a household word and to make IBM almost the synonym of computer.

The biggest decision, called "the \$5 billion gamble" by *Fortune Magazine*, was the introduction of the 360 line in 1964 which for the first time offered computer users a unified, compatible computer family.

Watson Jr. suffered a heart attack in November 1970 and then retired as chairman and chief executive officer of the firm in June 1971, relinquishing those posts to T. Vincent Learson.

But after a time of relatively little activity he resumed a larger role in the firm from his position as a member of the three-man corporate office that directs the firm, the position he resigns from at the end of this month.

## 'In-Touch' System Now out of Touch

(Continued from Page 1)

by computer.

Expansion was the problem, according to Gelzer. Many early users were computer sophisticates. System advertising stressed the involvement of the computer in the services offered. That appeal soon reached its limit, he said. "I would emphasize the computer less, and the bill-payment service more if I were to do it all over again," he added.

Quite a bit of data was gathered before In-Touch was discontinued. User profiles showed that users stayed an average of three or four months, had an average income of around \$13,000, and came in contact with computers in other aspects of their lives.

The main complaints were lack of weekend computer time, the Touch-Tone interface, limitations on how many merchants joined the bill-paying service and high cost. The computer itself was not a problem; service was only interrupted twice during the six months of operation.

There are no known plans for a similar service elsewhere in the country.

## IBM Extends Support

(Continued from Page 1)

said. Asked about possible antitrust action against IBM by Sanders, the spokesman said he had no further comment.

Ken Kashmarek, a member of the data processing staff at the University of Iowa and a former chairman of the Share user group study committee on CICS, noted: "Speaking for my installation, I would expect this is a good move. Users have been striving for this type of support because a large segment of the user population has purchased or has long-term leases on 2260s or 2265s."



# ADR Announces Enhanced Autoflow II System

PRINCETON, N.J.—Applied Data Research offers a new EDP approach to IBM 360/370 DOS and OS installations. AUTOFLOW II users can extend control, improve productivity, and optimize communications throughout the entire program/system development cycle.

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These new dimensions of AUTOFLOW II span the entire system development cycle—from design through implementation, verification, and maintenance.

Benefits of the AUTOFLOW II environment include: comprehensive management review facilities; operational system support; accelerated development progress; control of programming re-

sources; stabilized development procedures; and well-defined directions for all development tasks.

The total AUTOFLOW II environment is created and sustained through four unique options:

- **Module Analysis Processors (MAP)**—accept and analyze over 20 different source languages to produce extensive cross-referenced listings, summary analyses, and graphic charts focusing on various aspects of program activity and logic.
- **Cross-Program Auditor (CPA)**—examines and reports upon the characteristics of any number of input programs, across program boundaries, within the context of their functional interaction as a total system.
- **Extended Text Compositor (ETC)**—automates the preparation, composition, maintenance, and production of all forms of textual documentation.
- **Automated System Charter (ASC)**—

automatically generates high-level system charts and reports, thus producing a panorama of job flow throughout an entire system. (This option will be available in mid-1974.)

## Advanced Development Assistance

With these new facilities, AUTOFLOW II qualifies as an advanced development tool which can substantially reduce programming time and EDP costs.

ADR training aids, comprehensive documentation, and continual maintenance make AUTOFLOW II an efficient, easily used, and well-supported EDP asset. Automated error-reporting and distribution procedures expedite debugging and release of new product enhancements.

A variety of pricing plans (based on long-term, annual, or monthly charges) allows EDP management to select the most economical approach in furnishing AUTOFLOW II facilities tailored to an installation's unique requirements.

## Versatile New Aid Analyzes Entire System Activity

PRINCETON, N.J.—A facility for the complete analysis of programs within an entire system further extends AUTOFLOW II's versatility.

This capability is provided by the new Cross-Program Auditor (CPA) option which permits integrated analysis of groups of program modules. CPA-generated reports can decrease the time and cost required to support applications systems, as well as increase the reliability of applications in a production status.

CPA reflects the latest advances in extending user control over ongoing system activity by providing analytical information on program inter-relationships and file organization.

## Wide-Ranging Usefulness

By generating valuable analytical reports, CPA is a versatile program development aid with wide-ranging usefulness. CPA can simplify all maintenance activities, assist the data base administrator, forecast the scope of planned conversions and enhancements, monitor conformance to standards, and help in programmer training. CPA reports can also help meet the needs of auditors (either external or internal) by presenting comprehensive, highly structured reports of the often complicated interaction of programs within a system. Further, an auditor can selectively search for those names, structures, locations, etc., which are particularly relevant to the specific purpose of the audit.

## Automated Text Composition with AutoFlow II

PRINCETON, N.J.—Automatic preparation and production of constantly changing narrative material—ranging from design specifications to policy manuals, internal documents, and final documentation for a project—are now available with AUTOFLOW II.

A new word processing option—The Extended Text Compositor (ETC)—dynamically extends AUTOFLOW II's graphic and narrative communication facilities. ETC simplifies the production and maintenance of all types of textual documentation.

## Relieves Many Problems

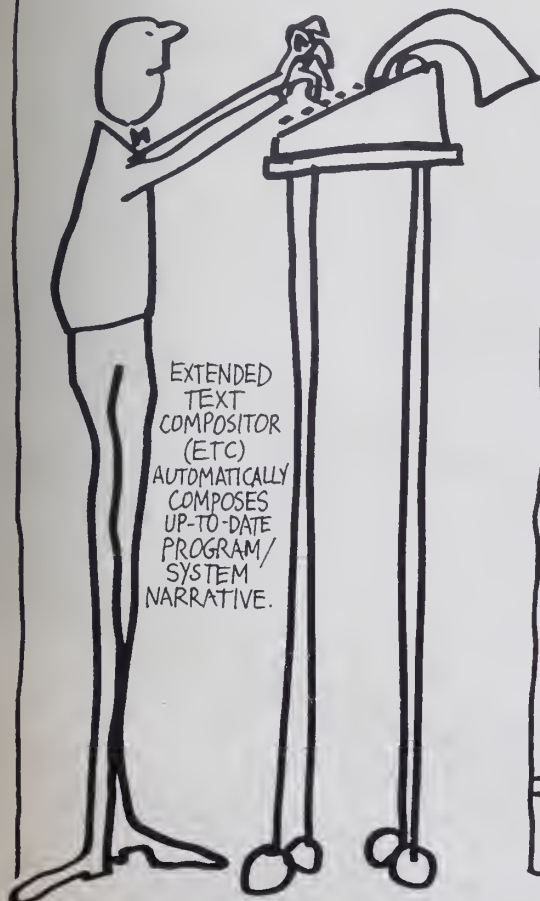
ETC relieves the user of many common problems associated with documentation production. It allows preparation of a continuous data stream which will be composed automatically to produce pages of formatted text on a high-speed printer. Thus, all systems specifications and other narratives can be made available in hardcopy form when needed. Further, even when specifications change, all supporting documentation can be easily and immediately revised via convenient ETC updating commands.

The new word processing option handles line editing, line overflow, justification, and the proper dating of documents. ETC also provides an automatic table of contents facility and a comprehensive index generation capability. Through a facility analogous to the macro capability in Assembly languages, ETC can eliminate much repetitious data entry. ETC also enables entire sections of text to be conditionally included or omitted in the printed document.

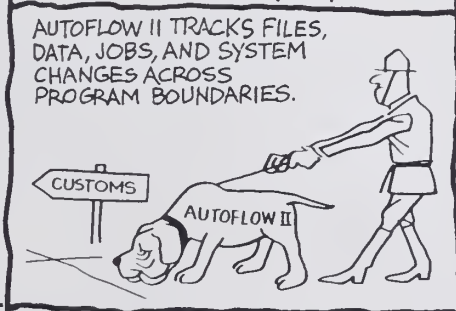
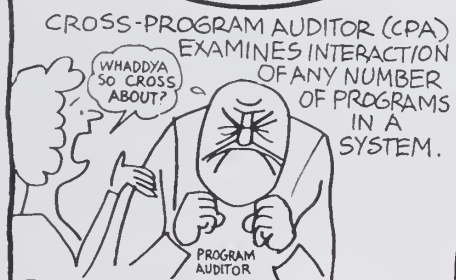
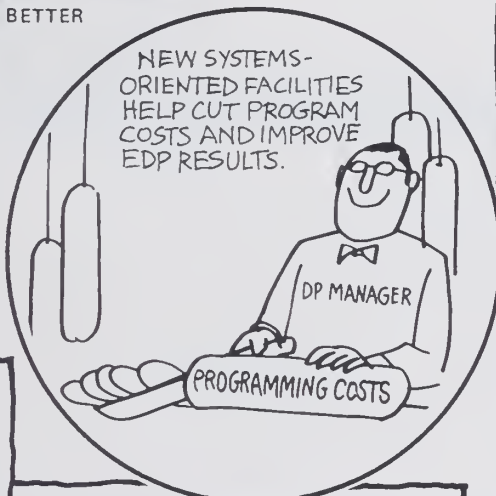
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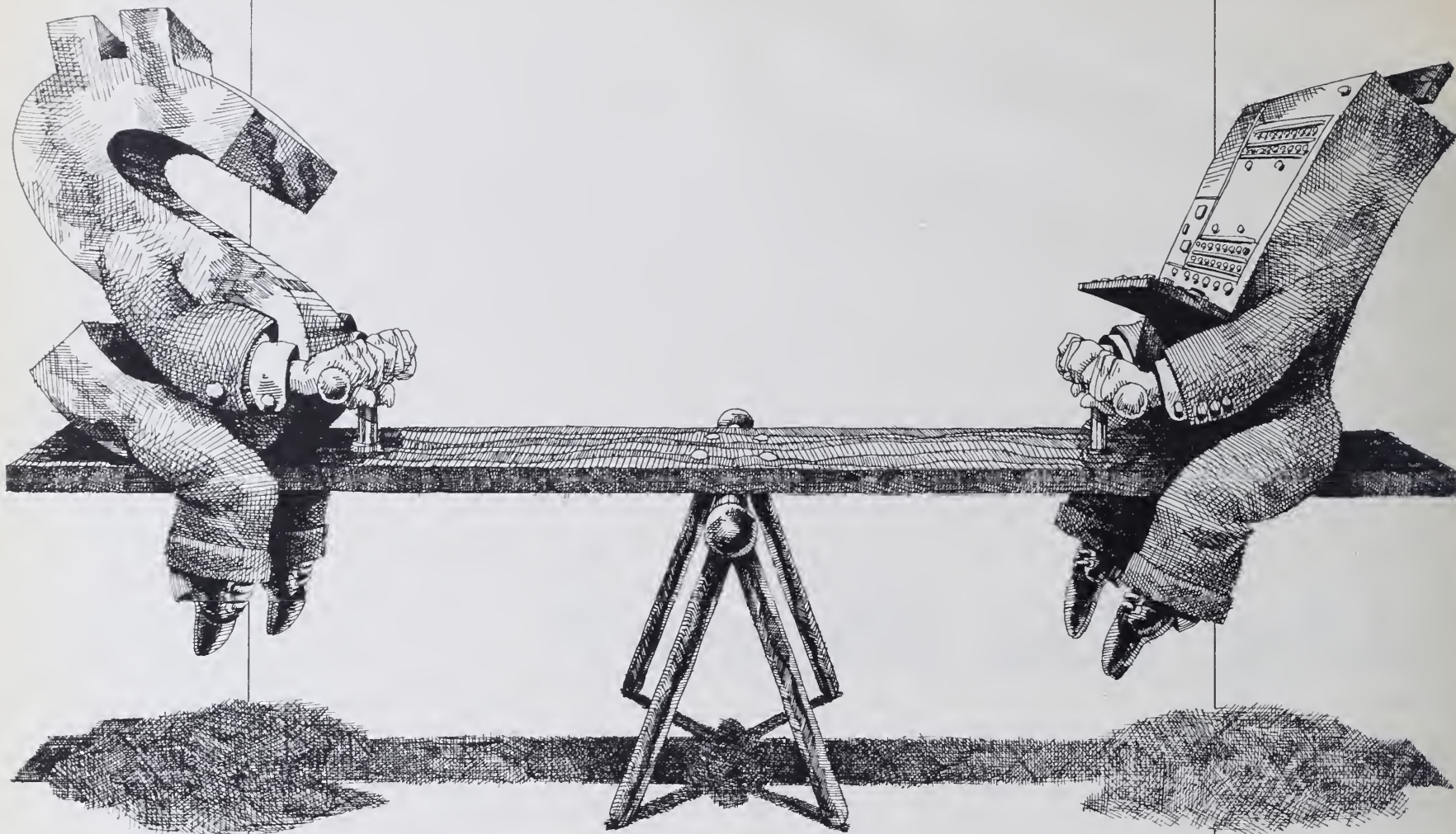
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## The buyer's market and the seller's market for a used IBM 370 are now the same.

Gone are the days when a fluctuating supply of used IBM 370's in the marketplace would send prices madly rising and falling.

If you were buying, there was an excellent chance that you were buying too high.

If you were selling, you could have been selling too low.

However, ITEL has now struck a happy medium. By building up an inventory of used 370's, we've created a stable supply situation. And so, to a large degree, we've stabilized prices.

If you're buying, ITEL can provide the exact 370 configuration you want—when you want it. (And we won't just quote you a price. We'll quote you a serial number, too.)

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## Uncontrolled Environment

# People Prove to Be Sticking Point in System Tests

By Don Leavitt  
Of the CW Staff

WASHINGTON, D.C. — People create an uncontrolled — and probably uncontrollable — environment for any computer system evaluation test and "we've done various experiments that prove the point," analyst Toni Shetler of Rand Corp. told 130 measurement experts gathered recently at the National Bureau of Standards.

Speaking to the Computer Performance Evaluation Users Group, she said people, especially operators, are unpredictable and in a sense unreliable, either because they feel threatened, in which case they try to disrupt the proposed improvement, or they feel pleased that "someone" is interested in what they do, in which case they try extra hard to improve the results of the experiment.

### Efforts Conflict

Remember, Shetler went on, the operators generally don't know what the experimenters are trying to do, or they don't care, or they don't feel they have time to work with the proposed changes. The result is the same: instead of their efforts being complementary to the collection of "hard data" about the system, they often distort the meaning of the data.

## Society to Encourage Computer Use in Law

LONDON — A group of British barristers and solicitors have set up a society to examine the ways in which computers might benefit lawyers.

The Society for Computers and Law intends to encourage the use of computers among lawyers. The new group also plans to conduct research into the future information needs of lawyers and into the information needs of the general public regarding legal matters.

### Prevents Duplication

The society hopes to coordinate the development of legal information services to prevent duplicate and competitive services.

Incorporated into the new society is the Scottish Legal Computer Research Trust, established in 1970.

One technique for good results is supposed to be preparing the subjects to ensure their awareness of the experiment's purpose, she said, but one test showed that it might be better to keep the operators ignorant.

In that situation, a multiprogramming job stream wasn't going any faster than a single stream. The experimenters decided to put spooled output for slow-speed devices on a separate channel. This required a special, short-term hook-up to peripherals normally used with a system across the room from the test site.

The end users weren't told of the change since it was transparent to them. The operators were told part of the story, namely the slight changes in the console messages they would have to use during the test. The operation of the modified system was then monitored just as the normal system had been previously.

The results seemed to go beyond the experimenters' wildest expectations, Shetler said, and luckily they became extremely skeptical of the apparent improvement. Further investigation showed, in fact, that the operators had been so excited about the test, they had come in early, worked harder, skipped coffee breaks and generally "cooperated" so well that the test was worthless and had to be rerun.

In another experiment, she said, CPE experimenters wanted to get an objective measurement of how reducing the time-sharing users from four to three partitions would affect their operations. They told the users they would have all four partitions on Monday-Wednesday-Friday, and the three partitions on Tuesday and Thursday. They also asked the users to fill in a specially designed questionnaire each time they completed a terminal session during the test period.

"Naturally, we didn't get any questionnaires completed," Shetler noted ruefully, "but we got 'a lot of static' about the service on Tuesday and Thursday. The irony of the situation was that we had lied to the users and had actually given them full service on Tuesday and Thursday, and the three-partition service on the other three days."

There are ways other than lying to get around the "people problem," Shetler added, and these normally revolve around running tests long enough, or analyzing a long enough period of data so that short-term perturbations have less impact.

Tests have to be based on hypotheses worked out in the "controlled environment" of the hardware/software system itself, and then verified in the "uncontrolled environment" of the real world, complete with operators and other personnel who have their own motives which can be weighed in the original planning.

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# The Joy of Donating a Computer — All Benefit

By Toni Wiseman  
Of the CW Staff

**BOSTON** — With the rapid advances in computer systems in the past few years, many companies possess outdated machines and no idea how to dispose of them, without risking a substantial loss on their investment.

At the same time, many schools are seeking this type of equipment.

The solution to both problems appears to be a logical matching of supply and demand. The benefits to the educational institution are obvious, and the donating company also has much to gain.

A corporation may make charitable donations, annually, of up to 5% of its taxable income. There are, however, carryovers. If a gift exceeds the limit, the balance may be carried over a period of five years, with the stipulation that the excess shall not exceed the 5% limitation in any one year, according to Boston lawyer Nestor Nicholas.

Carryovers are also available if the company is acquired by another corporation, Nicholas said. Thus, they are considered assets in the same manner as unused losses.

Legally, Nicholas said, computers are considered tangible personal property. This means a donation can only be written off if the charity uses the

gift directly in its charitable enterprise. In the case of schools, education is considered a charitable enterprise, Nicholas affirmed.

"When faced with the decision to sell or donate, a company should seriously consider going the charity route," Nicholas stressed. "There is a good chance that it will be able to establish a fair market value higher than what they could actually get if they were to sell on the open market."

An added benefit to consider is the public relations value of a donation. A small financial loss will certainly be offset by the time and aggravation saved in escaping the hassles of a sale, and by favorable publicity.

John Haller of Modular Computer Systems, Inc., sees donations as a bona fide way to get equipment (which in many cases a company can't get rid of) out of warehouses and into operation.

Besides the financial considerations, Haller is concerned with the future. "It's sort of like training in the Little Leagues," he said. "If we can get the kids acquainted with the equipment now, later on when they get into industry, they're going to have a feel for the type of gear they need."

Most universities and colleges and many high schools already have their own data processing equipment. And some, such as Daytona Beach Com-

munity College (DBCC), would not be interested in "dated" equipment except for electronics courses where the students would simply tear them apart and learn to reassemble them, according to DBCC computer science professor Harry Muntz. But even this, he said, would be a worthwhile use.

Though there are still colleges which do not own CPUs, the preponderance of "worthy causes" falls in the junior high school, vocational school and community college categories.

Derwood Huneycutt, superintendent of the Thomasville, N.C., Board of Education, said he may have to drop the current DP program because of financial considerations. Over 125 students were enrolled in the computer course last year, he said, and that number is always increasing.

"We're mostly interested in letting them learn the languages and seeing what a computer can do, so an outdated computer wouldn't hurt us at all. And certainly it'll be worlds better than no computer at all," Huneycutt said.

The James J. Reynolds Jr. High School in Brooklyn, N.Y., started a program this year on a ninth grade level using programmable calculators.

"We found that as a motivational tool computers really turn the kids on," Stephen Storman of the mathe-

matics department said. "One kid started working on Einstein's theory of relativity and took the negative view of it," Storman said, "and he could be working at Princeton right now, because they think he's right."

Storman, like many other educators surveyed, would like to see the industry get involved in the education process now because "it's to their (industry's) advantage too. Not only will some of those kids become the programmers and analysts of the future, but if they should go into business they'll have a background in DP which will make everyone's job easier."

Belknap College in New Hampshire would "definitely be interested in having a computer donated to them," according to a math professor there. Belknap, he said, will probably have to tie into the Dartmouth Time-Sharing System for financial reasons, "but an on-line computer would certainly be preferable for teaching anything," he said.

Storman summed up the general feeling by saying, "We're not asking a company to give us \$1 million worth of equipment; all we're saying is that if there are IBM 1401s or other machines around, we'd love to have them. We're not worried about having to wait a few minutes for an answer, we're worried about teaching these kids Fortran, Cobol and real tangible skills."

## With Audit, Measurement Tools

# Reliability Must Be Built in, Not Added Later

DP security is a complex, interactive mix of physical, procedural and data protection, with a healthy amount of backup and audit.

The first two parts of this series give an overall look at the security responsibilities of both users and vendors, while future parts will analyze in detail the threat to security and protective measures to minimize security risks.

We have seen that the user is responsible for data security. However, it is very significant that the manufacturer also has responsibility. Without covering detailed security requirements in computer systems, let us look at the four major responsibilities of a manufacturer.

The first responsibility is to build reliable hardware and software. System integrity is an elusive goal. We know that manufacturers have for years attempted to improve the reliability of equipment, and many aspects of third-generation systems have helped increase this reliability. However, software is still suspect. Today's operating systems are monolithic, complex structures, and one study has postulated that each major release contains at least 1,000 bugs. Until we see the development of modular, microprogrammable, compartmentalized and error-free software, we will still have problems.

The second major responsibility is to provide access control mechanisms within the computer system. Access control is essential to provide security and confidentiality. These mechanisms must be designed in, not added later.

The third major responsibility is to give users audit mechanisms. The security goal is that all data movement and up to 100% of interface exchanges should be recorded.

The fourth major requirement is to build

adequate tools of measurement for each mechanism. These measurements should include integrity aspects, such as, Does a particular mechanism perform? Is it malfunction free? Can it be nullified, subverted or circumvented?

Measures of reliability should be available. One should be able to determine each mechanism's cost in dollars and time.

Finally, the user needs to know how much effort should be necessary for an intruder to get around the security mechanisms. The user needs to determine his exposures to threat and potential damage in dollars in order to calculate his risk and therefore determine the modular security mechanisms which he needs to install. The responsibility of the manufacturer is to provide these measurement tools.

Let us look at some of the basic goals of secure operating systems. First of all, security should be designed in, not added later. It should include elements of authorization, audit and measurement. Security mechanisms should be isolatable; not interspersed throughout a very large, complex, monolithic operating system. In fact, there is a lot of merit in including them within hardware.

Secondly, they should be subject to mediation. In other words, all references to data must pass through security authorization mechanisms. There should be no ability to bypass the authorization. Changes to the mechanisms or the authorization data bases must be controllable and auditable.

Finally, the tenet of simplicity is of upmost importance. Whenever one has complex paths of choice, the 1,000 bugs per release start occurring.

Systems must provide identification, authentication of identified objects and an authorization data base, dedicated to the particular needs of each user. This authorization should be capable of being developed down to the data element level and must provide an immense amount of flexibility.

From a user's point of view, the current state of the art should allow quite flexible, cost-effective security measures. But, in practice, they aren't there. Safeguards

are imposed after the fact, usually only for physical security and at managerial insistence, and then only rarely.

Users are calling for the manufacturers to provide flexible, responsive, auditable, reliable, manageable, adaptable and dependable computer systems.

## Part II Vendor Responsibility

The manufacturers are calling for users to decide what they want and to say what they want. If users would show some effort towards safeguarding their installa-

tions, the manufacturers would be more willing to design security into their systems. It is a two-way street.

Whenever designers and implementors agree on the needs, and the manufacturers supply users with secure hardware/software combinations, we will finally realize the goals of simple, economic, functionally capable and modular protection mechanisms.

Part III of this series will define some of the actual threats to an installation's security.

Peter Browne is superintendent, DP Executive Office, State Farm Mutual Automobile Insurance Co., Bloomington, Ill.

## Peter Browne On Security



# Court Rules Bell Must Supply MCI

(Continued from Page 1)

control switching arrangements (CCSA) and foreign exchange (FX) lines to MCI customers.

AT&T has said the local loops, needed to connect users from their sites to MCI facilities, cannot be provided pending approval of tariffs filed in each state. MCI, on the other hand, claimed these local loops were part of interstate services and were under the jurisdiction of the FCC instead of the state regulatory agencies. The court ruling supported the MCI position.

## Direct Interconnection

By ordering the telephone companies to interconnect MCI customers with CCSA and FX facilities, the court has in effect given the specialized carrier direct interconnection with Bell lines on the same basis as independent telephone companies.

"The real victor in this injunction is the user," declared William McGowan, MCI's board chairman. "We sincerely hope the local Bell companies will now actively cooperate with us in providing all of the various services that the business community desires. The federal court injunction and the attitude of the government seems perfectly clear. They are saying

that the business community should have a choice of intercity communications suppliers and that AT&T cannot use its control over local Bell telephone companies to thwart this decision," he said.

## Theodore H. Brown, DP Pioneer, Dies

ENGLEWOOD, Fla. — Theodore H. Brown, 85, an early adviser in the IBM computer effort, died here last week.

Born in Connecticut, the mathematician and computer pioneer received his AB, MA and PhD from Yale.

## Encouraged IBM

He was influential in encouraging IBM during its conversion of the concept of the computer from a mechanism to electronic device.

He was a member of the advisory board of the Watson Scientific Computing Laboratory, established by IBM at Columbia University, from the lab's inception in 1945; his vision was an important factor in the first interactions of business statistics, pre-electronic data processing machines and the digital computer, sources said.



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## Software Houses, Time-Sharing Firms Pay Top DP Salaries, Survey Shows

By Molly Upton  
Of the CW Staff

NEW YORK — Software houses tend to pay the highest average data processing salaries for five of six selected positions, according to the 1973 Wage and Salary Survey by the Association of Data Processing Service Organizations (Adapso).

Time-sharing firms paid the top salary for one position, and service bureaus failed to provide the highest average pay in all six positions.

### Where the Salaries Are

Software houses generally paid the highest for the positions of data entry assistant supervisor/senior operator, operations shift supervisor/senior operator, and operators, as well as senior programmers.

The average weekly salaries of all companies surveyed were \$135 for a data entry assistant supervisor/senior operator, \$192 for an operations shift supervisor/senior operator and operators' salaries ranged from \$137 to \$171, according to the study.

A senior systems analyst averaged \$316, while a senior programmer was paid \$283. Other programmers' salaries averaged between \$266 and \$202.

Pay varied according to geographic region.

Average pay for a data entry assistant supervisor/senior operator was highest in the Northeast, \$151, as was the pay range for programmers, from \$242 to \$217.

The highest average salary for shift supervisor/senior operator was found in the Northcentral area, with a weekly pay of \$215. Operators were also well paid, relatively speaking, with salaries of \$188 to \$175.

The South gained distinction for the highest average pay for senior programmers, \$311, and for programmers, \$320 to \$207.

A senior systems analyst in the West had fatter paychecks on the average than elsewhere, with the figure running around \$362.

Time-sharing firms gained top honors with the average pay of senior systems analysts at \$423.

Software houses took top honors with the highest average pay in the fields of data entry assistant supervisor/senior operator, \$180; shift supervisor/senior operator, \$207; and operators, the best of whom received \$181.

As might be expected, software houses paid the highest for senior programmers, \$306; and for programmers, from \$295 to \$215.

### Employees, Sales

T/S firms tended to be larger both in terms of employees at one location and annual sales than either service bureaus or software houses, according to the survey.

Fifty percent of the T/S centers responding said they had 75 or more employees at one location, whereas the largest percentage of service bureaus responding, 45%, indicated they had under 20 employees. Similarly, 18% of the software houses had under 20 employees.

The larger percentages of responses by the three industry sectors showed that T/S firms tended to have larger sales volumes.

Of the T/S firms responding, 37.5% had revenues of \$3 million or over, whereas the single largest percentage of service bureaus, 17%, made between \$200,000 and \$299,999 a year.

The largest concentration of software houses, 9%, was also in this category.

The figures were compiled from survey responses submitted by 176 firms, including 127 service bureaus, eight T/S firms and 37 software houses, as well as four facilities management firms.

The report is available for \$15 from Adapso at 551 Fifth Ave., N.Y., N.Y. 10017.

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different levels of sophistication, and Edutronics modular courses, featuring full color video tapes and films, workbooks and study guides, are ideal for swing-shift operators who cannot obtain necessary education during their normal working hours.

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## DPMA to Get Involved In Privacy Legislation

PARK RIDGE, Ill. — Plans are under study by the Data Processing Management Association (DPMA) which would involve the association in proposals for the development of safeguards of individual privacy, confidentiality of data and security of computer systems.

"It's vitally important that legislators or legislative committees considering proposed [privacy] laws, as well as other interested groups, get the advice and counsel of professionals in this field in order to produce the most meaningful and workable guidelines," said Robert J. Marrigan, representing DPMA at a National Bureau of Standards conference on privacy and security in computer systems.

DPMA's move toward greater participation in this area was spurred by the plea of Under Secretary of Commerce John K. Tabor for "safeguards for privacy, soundly designed, unbreakable and foolproof." He stressed the need for the development of administrative, legislative and technological controls.



# How to take the risk out of recommending a data entry system.



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## Free to 'Right' Candidates

# Service Analyzes Voting Trends, Political Moods

DETROIT — If you were running for office in Detroit and believed in the "right things," you could have an electronic friend to help run your campaign after the primary.

Urban Alliance, Inc. (UA), a non-profit, "biracial, interfaith, non-partisan voter information and candidate-rating organization," each year conducts computer analyses of election returns to "get some feel for voting trends in the city, projections of probable winners and losers, and political moods in the city," according to Larry Horwitz, secretary of the organization.

These analyses are furnished free of charge to candidates endorsed by UA — after filling out a questionnaire and being interviewed — as a guide in campaign decision-making. For example, the recently elected black mayor of Detroit,

Coleman Young, made use of UA information in his campaign activities last fall, according to Horwitz.

Maps were made from the data compiled, aiding decisions on where to distribute literature door-to-door, where to direct mailings effectively, what kind of mailings to send out and where to put precinct workers. In short, the data became a "tool to make decisions on assigning scarce resources," Horwitz said.

"Without the computer the information couldn't be made available that fast," Horwitz said. "It would be of no value in running a campaign."

The computer analysis enabled UA to find out which parts of Wayne County and the city of Detroit were most responsive to the kinds of candidates it was interested in supporting and helped determine what kind of information should be

circulated in those areas.

In order to be effective, the system first broke down the Detroit voting precincts into census tracts. "It is only at the tract basis that the Census publishes information regarding the more interesting socioeconomic variables, such as education, income and job-related information," Horwitz said. A tract averages between 3,000 and 5,000 residents, he added.

Using this information, Horwitz said, UA was able to break down the election results data into "overwhelmingly black," "predominantly black," "mixed — mostly black," "mixed — mostly white" or "overwhelmingly white" sectors with incomes of "less than \$10,000," "\$10,000 - \$12,000," or "\$12,000 and over." For example, UA could see how the "mixed — mostly black" sector earning between \$10,000 and \$20,000 voted for each of the five candidates in the mayoral primary.

### Mixed Areas

"Typically in this city, as in many cities where there's a major black population, people just analyze the totally black precincts and the totally white precincts. A precinct that is totally black is by and large an inner-city ghetto precinct," Horwitz said. He feels the black population with more money votes differently than the ghetto dwellers. Horwitz explained that middle-class blacks tend to live in areas that are not totally black, but that most analysts don't even look at the mixed precincts, which make up a large

## 3 Programs Do It

DETROIT — Urban Alliance, Inc., a local candidate-rating organization, makes use of three different major programs in its computer analyses of election returns. "We've been developing them as we went," said Larry Horwitz, secretary of the organization. We started writing them last November and wrote different programs at different periods."

Among the existing programs are a "file-create," "tract-split," "print," and several minor programs.

"It is very time-consuming to create a data bank. Once the data bank is set up and the programs are running we are able to do these things very speedily, which is essential when the interval between the primary and general elections is eight weeks," Horwitz said.

The programs were written in Fortran to be run on an IBM 360/67 duplex with a 2M-byte memory located at Wayne State University.

part of the voter population.

"None of this analysis requires the use of a computer," Horwitz said, "but without it this would become a tremendous data problem — we really couldn't do it. There's no way we could have gotten it out in time. We had finished that particular [mayoral] analysis within 60 hours after the polls had closed."

## Plotter Produces Pattern Pieces

Special to Computerworld

SEATTLE, Wash. — What do seamstresses and computers have in common? Up until now, hardly anything. But if a Seattle seamstress has her way, computers will become an integral part of the dress design process.

Jacqueline Hahn, owner of Jackie's Patterns in Des Moines, has designed a system which uses computer-produced plotter pattern pieces as a basis for the do-it-yourself dressmaker.

To use the system, the would-be seam-

stress takes a complete set of self measurements. This data is sent to Jackie's Patterns where it is fed into a pattern piece production computer program. The output of the program, a complete set of plotter-produced, custom-tailored dress pattern pieces, is delivered to the seamstress.

The system is expected to be particularly useful for the person whose figure does not conform to standard dress sizing.

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## 360/370 APPLICATIONS/ SOFTWARE SYSTEMS

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### APPLICATIONS DEVELOPMENT

Business, Financial, Manufacturing with OS, HASP, MVT, MFT experience. IBM package experience, BOMP, IMS, CICS and teleprocessing design and implementation on any IBM terminals or compatible CRTs. QTAM or BTAM. Most important the ability to define, design or implement business applications.

### SOFTWARE SYSTEMS DEVELOPMENT

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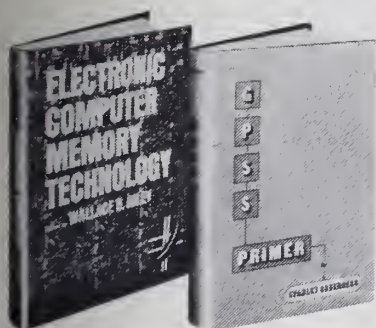
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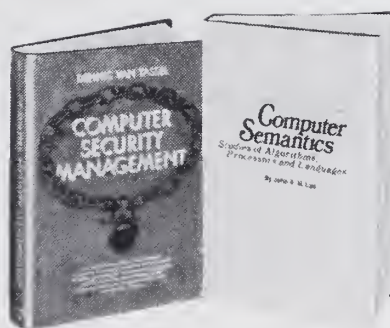
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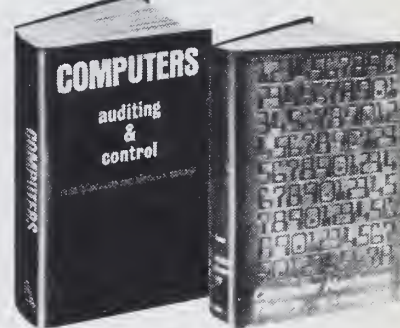
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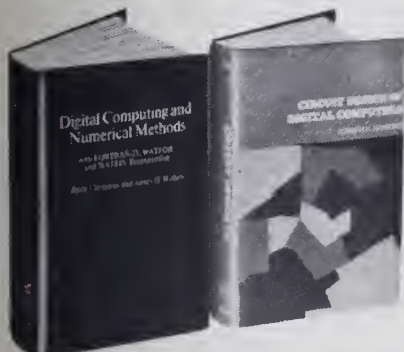
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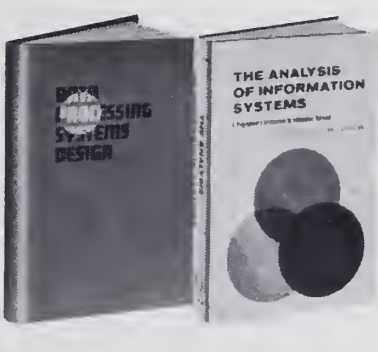
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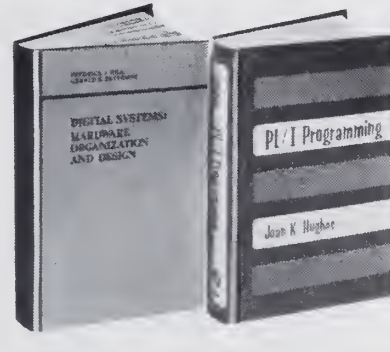
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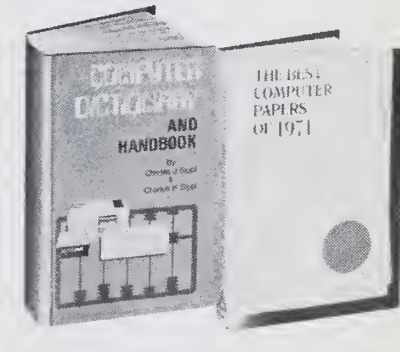
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## Planning in Paterson — Part I

# Fast Growth Outmodes City Agency's Data Handling

By Anthony DeFranco

Special to Computerworld

PATERSON, N.J. — The Planning Board of the City of Paterson is not unlike many other government agencies. While it depends on current and accurate data for sound program and policy decisions, the increasing volume of information available as the city grows makes traditional modes of data handling far from satisfactory.

In response to this need for more timely data and the expected future growth of the city, the planning board decided to reexamine its data gathering and analysis procedures with the goal of keeping its role in government a vital one, yet without increasing the staff.

The first decision to be made was whether to design a more efficient manual information system or automate the present system.

The decision to use an automated system was based primarily on a study of the data requirements of Paterson's urban planning projects.

### Daily Operations

The planning staff prepares on a routine basis over 600 reports per year for various government agencies. To prepare these reports, the staff must make use of many types of data including:

- Zoning data — This tells the planner whether the proposal is a proper one for the area and includes lot and building size

requirements.

- Land use data — This gives the current and proposed uses of the land, including distribution of buildings, roads and open spaces.

- In some cases, utility, traffic, parking, loading, tax, census, construction codes and flood zone information are also needed.

In addition, in-depth reports provide the planner with policy parameters to evaluate whether a proposal is consistent with the city's overall objectives.

While most of this data had to be current to be usable, the updating methods were archaic, costly and ineffective. (It took two years to update certain studies, at a cost of \$200,000 each.)

There was no continuous mechanism wherein such agencies as the Board of Adjustment, Building Department and Tax Department could supply information to the planning staff to update its

files. There was no centralized source of data available to all departments.

In addition, there was no standardization in the way data was collected. For example, the planning board used U.S. census tract designation while the tax office used political wards. This made the processing and interpretation of data difficult, if not impossible.

### Proposed Solution

The proposed solution revolved around the concept of a data base, a computerized filing system which would contain land use, zoning, traffic, tax, census, health, police, fire, engineering and policy data on a block level.

The advantages of the data base are:

- It provides a central source of information.
- It provides a mechanism for systematic continuous updating.
- It provides for effective response to

inquiries.

- It forces standardization.
- It enables the user to perform complicated searches.
- It enables the user to evaluate alternative proposals.
- It makes possible the use of simulation and cost/benefit techniques.
- It enables the user to access data which is amenable to statistical evaluation.

Through the use of a unique coordinate system already operational, information can be retrieved at tract, block group, block, parcel or parcel group levels, enabling officials to make timely policy decisions.

*Part II of the series will discuss the question of time-sharing vs an in-house system and will look at the relationship between the planning and DP staffs.*

*Anthony DeFranco is a city planner in Paterson, N.J.*

GRASP, in use since 1968, is now installed in hundreds of installations. It's the most effective DOS systems software available today. And now, SDI offers a powerful companion package, GRASP/VS.

GRASP/VS is THE spooling system for DOS/VS machines. It runs in virtual storage, uses far less core and disk than POWER, and was designed to run fast and improve performance.

GRASP/VS recognizes that, Virtual Storage notwithstanding, real core is a most valuable commodity. GRASP/VS is not a "real core grabber." It uses a highly sophisticated buffer allocation algorithm which reduces paging

to a statistical minimum. Every DOS/VS user will benefit from GRASP/VS because the real core saved by replacing POWER with GRASP/VS goes directly into the page pool, resulting in an immediate improvement in performance.

Other GRASP/VS features include comprehensive Job Accounting routines which allow internal or external billing of jobs running in a virtual machine, as well as providing reports which monitor paging activity and system capacity.

For the non-VS user, GRASP remains the best price/performance investment available.

## Grasp and the Two powerful packages designed the performance of



## Fabric for Furniture Fed to Small System

AUSTIN, Texas — A computer at Economy Furniture Industries here is helping company officials keep track of hundreds of miles of fabric a year.

Last year Economy used 386 miles of different colored and textured fabric in its furniture covering operations.

Soon, Economy plans to use the computer to keep a continuous accounting of other supplies ranging from lumber to mattress buttons. The company makes all the furniture it sells from raw materials.

"We used to shut down our entire operation every six months for a day and a half to take inventory," said Paul Gardner, Economy's data processing manager.

Gardner said it sometimes took two employees a full workday just to match fabric inventory to orders.

Now, as fabric is purchased, the amount, color, style and texture is recorded by the computer, an IBM System/3 Model 10. When fabric is used this information is also recorded by the computer thus giving Economy officials an accurate account of what is in their inventory at any time.

The System/3 is also helping Economy keep up with changing trends in the furniture industry. The computer categorizes purchases by retailer, geographic location, style, type, color and salesman.

The company also uses the system for several other purposes including payroll, order entry, billing and printing labels for mailings.

Reports generated by the computer are used by Economy salesmen as sales analysis tools to chart usage patterns of customers.

## There's No Doubt About It

TAUNTON, Mass. — There is a billing firm out there somewhere that seems to cancel all delinquent accounts and announces it in a very insistent manner. Stemming from a computer-related error, a local store recently received a letter "explaining" the symbols on a delinquent account list.

Next to one asterisk was the explanation, "Account cancelled;" for two asterisks, a note read, "Account cancelled;" and for three asterisks? You guessed it — "Account cancelled."



## For Data Acquisition

# Mini Complements Test Tubes in Chemistry Lab

POTSDAM, N.Y. — In the popular notion, chemistry students pursue their studies of the composition and properties of things with test tubes, beakers and Bunsen burners.

At the chemistry department at Clarkson College of Technology, students also use a minicomputer.

Dr. Louis Meites, chairman of the chemistry department, believes that making computer terminals available to students right at their laboratory benches is one of the most important things his department does in training chemists who will be up with — or slightly ahead of — the times.

"The computer enables students to conduct many kinds of experiments that would be difficult, if not impossible, with other techniques," Meites said. "Making measurements is an important part of what chemists do in the laboratory and the computer helps by recording and storing the results as they are obtained.

Later, after the experiment is completed, the computer recalls the data and makes numerical calculations with them.

"Replacing the slide rule as well as the laboratory notebook, the computer enables students to concentrate on the chemical problems they are studying and on the meaning of their experiments instead of on the numbers and the way they are handled," he noted.

### Research Grant Helped

A research grant from Eastman Kodak Co. combined with a grant from the National Science Foundation enabled the Clarkson chemistry department to acquire its computer in 1970. Since then, subsequent Kodak grants have helped Clarkson expand and improve the computer system with additional terminals, more core memory and other devices.

According to Meites, the department has about 100 undergraduate chemistry

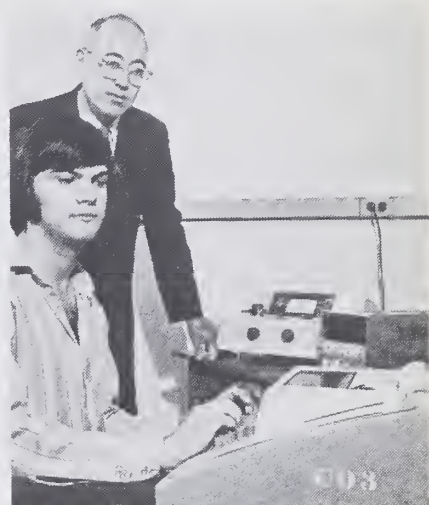
majors, 60 graduate students, 15 post-doctoral research associates and 16 full-time faculty members.

Students learn to program the computer and to use it for a wide range of numerical calculations. In addition, it is used for research at all levels.

"Our research has led to publication of at least 15 papers in which the computer played a major part," the department chairman said. "The computer is very widely used throughout the department, and we've developed some entirely new techniques for data handling."

Meites said department personnel have prepared about 10 research papers that illustrate ways to use the computer in experimental measurement.

Clarkson's chemistry department has used its computer to date for experiments in polymer chemistry, analytical chemistry, colloid and surface chemistry, physical chemistry and inorganic chemistry.



David Arnold, a graduate student majoring in chemistry, and Dr. Donald Rosenthal, professor of chemistry, work at one of the computer terminals at Clarkson.

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## Five Universities Study DP Education

IOWA CITY, Iowa — The National Science Foundation has announced a grant that will make the University of Iowa the center for a group of universities working with computer education materials.

Five university computer centers have been organized into a group termed Conduit. They have received a grant totaling \$500,000 which will be used to develop a system facilitating the exchange of computer education materials, at the undergraduate level, between various parts of the country.

"A large amount of material exists on computer education, but it is difficult to obtain information on various programs in different parts of the country. The Conduit project will help solve this problem," said James W. Johnson of the University of Iowa computer center, who will serve as program director.

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## Card Protects Hotel Guests

NEW YORK — Guests at the Americana Hotel will soon verify their identities by card every time they enter their rooms. The procedure is part of a new communications security system recently patented by Edward M. Ulicki, executive vice-president of Telebeam Corp. Telebeam has begun installation of the system, trademarked Gardtel, in 1,860 rooms at the hotel, with financing by Motorola, Inc.

Each guest, upon checking in, gets with his key an identification card which the office computer relates to the assigned room. The guest inserts it in a card reader on the top of the television set when he enters the room. Any unauthorized entry or open door or window will be reported to the central office by the system.

Existing coaxial cables running to hotels or apartment houses will be used and distribution may also be made by telephone, laser or microwave.

### That's Continuous Music!

SHERMAN OAKS, Calif. — For those who don't have time to change the record, there is now a digital computer that composes music and is able to play for as long as 30 years without repeating itself.

The Muse, invented by two MIT computer experts, has 14 trillion possible note combinations. It is played by altering controls that determine note combinations, melodies, volume, tempo and pitch.

It costs \$295 from M.S. Fredkin Co., 15010 Ventura Blvd.



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- The use of facilities management.

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- How to insure on-time delivery of exactly what you've bargained for.

- How to reach an agreement that protects the security of confidential data.

- How to set reasonable performance standards for warranties.
- How to provide tax savings through proper wording of contracts.

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You'll also receive a valuable reference notebook which will back up the information you'll receive at this meeting. *The notebook will include sample vendor contract forms.*

Roy N. Freed, a leader in this field.

Roy Freed has specialized in computer-related legal matters for many years. He has served as inside counsel for a major manufacturer of digital computers, and is currently engaged in private practice with the Boston firm of Peabody, Brown, Rowley & Storey. He has authored many articles on the various legal aspects of computers — including "Computer Frauds — A Management Trap" (*Business Horizons*) and a reference book entitled "Materials and Cases on Computers and Law." Mr. Freed will personally conduct the entire seminar.

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## Editorial

### Good Sailing, Tom

The man who spurred the world into the computer age is retiring.

Thomas J. Watson Jr. did not invent the computer, but it was he and the other young Turks around him in IBM in the early 1950s who realized its true potential and brought the computer out of the laboratories into the world of business and society.

No one deserves more credit or admiration for this feat than Tom Watson Jr., who is retiring at the end of this month — the last active Watson in a firm the family has molded and shaped for exactly 60 years.

We've had our differences with IBM and some of its policies over the years, but it is difficult to imagine a computer industry and a computer-using community without the impetus given it in the early days by IBM under Watson's leadership.

Watson took a sizeable and aggressive company that had been ruled by his father for 42 years and drove it to its greatest period of growth, making IBM a household word and a colossus of worldwide industry.

And at the same time, Watson and the men around him revolutionized the world in a more profound and subtle way than had ever happened in the past — a revolution that is still going on and whose consequences cannot be measured.

Perhaps some will think it strong to credit one man or company with this feat, but their role as the driving force of the computer age in its formative years cannot be denied — pause and think of the computer development and application in those few areas of the world where there is no IBM.

Seizing on the commercial and social possibilities of the computer in a time when predictions abounded that perhaps a dozen computers might be in use by 1970, Watson and the men around him saw what few others could at the time, even if the vision was perhaps dim and cloudy.

Tom Watson Sr. used to say that all of the successes of IBM were not his accomplishments alone but should be attributed to the IBM "family" of workers, and of course all IBMers contributed to making the computer the ubiquitous tool it is today.

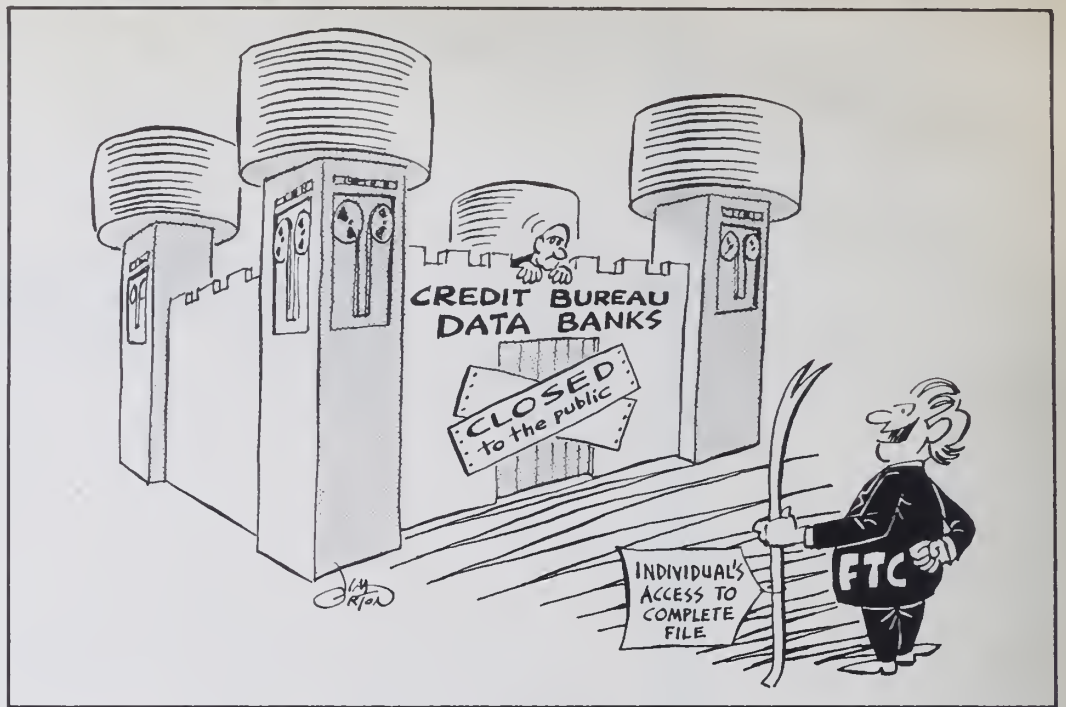
But the man at the top, who not only had the vision to realize the potential of the machines but also the iron will, salesmanship, and business acumen to drive the nation into using computers, deserves a great deal of credit.

In our profit-motivated society, technological developments often die for lack of markets, but Watson would not let that happen with the computer — and under his leadership IBM taught the world how to use the computer effectively. The startling growth of the industry and of IBM followed.

To accomplish this took a great deal of discipline and drive on the part of Watson and his confederates — probably more discipline than Watson says he gives the crews of his sailing yachts which have throughout the years carried the name *Palawan*.

Now there will be more time for sailing, and with the Watson drive and determination Tom Watson Jr. will probably be seen more on the pages of *Yachting* than in *Computerworld*.

We wish him the best of luck — and good winds.



'If Castles Are OK, Crowbars Are OK'

## Reistad Overreacted to Forbes' Speech On Need to Examine EFTS-Related Issues

By Seymour V. Pollack  
Special to Computerworld

It is always a good thing to have the air cleared by someone who is not a stranger in this complex area of Electronic Funds Transfer Systems (EFTS) and, therefore, presumably "knows." However, Dale Reistad's [CW, Nov. 28] thorough knowledge is successfully shielded and obscured by the voluminous smokescreen he has thrown up (no pun intended) in overreacting to the speech by Rep. John Forbes [CW, Nov. 7].

In my opinion, Ron Frank's report was a realistic reflection of what came across as a rather mild motherhood type of talk in which Forbes pointed out some of the issues that should be examined in view of the rapid rate with which EFTS changes are taking place. Other people at the meeting came away with a similar impression.

There certainly was no undercurrent of witch-hunting as Reistad implied and the type of rhetoric in which the talk was framed clearly informed the audience that the speaker was well aware of his unfamiliarity with the details of the subject and did not claim otherwise.

Reistad's flailings and sputterings display the kind of fuzziness he attributes to Forbes. The surveys mentioned by Reistad shed no light on consumer reaction to EFTS, nor is his reference to "computerization" any more enlightening.

As a matter of fact, nobody seems to be paying very much attention to the consumer vis-a-vis EFTS. During an entire DUA session devoted to EFTS no one from the banking industry mentioned any substantial benefits to the banking public, nor were any volunteered in response to questions from the audience. Hence, we are understandably cheered and reassured by Reistad's assertion that "EFTS adds a new dimension of fund transfer convenience" for the consumer. What could be clearer than that?

Reistad seems no stranger to a number of complex processes, among them the application and deployment of plot thickener.

When convenient, he isolates EFTS and treats it as an internal mechanism for reassigning funds already on deposit — avoiding any mention of how those funds got deposited, whose they are or where they came from; elsewhere in the diatribe, these processes are reconnected (as, of course, they are expected to be) in a multiplicity of harmless EFTS debit cards. In one paragraph he questions the need for an EFTS computer (what does

the readership.

Invasion of privacy is an issue, irrespective of centralized or decentralized data base organization. The possibilities for abuse do exist and the scale for such potential mischief is greatly enlarged by the use of computer-based information systems. That, Reistad, is no myth. The reason for the fuss (talk about misunderstanding and/or misinterpreting a subject!) stems from the recognition of this potential, coupled with attempts to identify technological and legislative precautions that will help keep such abuses hypothetical.

Speculation on why "the consumer (should) need redress from a technological improvement in the paper-bound payment system" may be a repeat of the kind of patrician approach that decided it was futile to look for any serious effects from a technological improvement over the horse and buggy. But then, Reistad tells us these are chestnuts, and he knows.

Seymour V. Pollack is an associate professor of applied mathematics and computer science, Washington University, St. Louis, Mo.

### Viewpoint

that "E" stand for, anyway?); in the next paragraph, there it is after all.

The entire stance of his mis-epitomizes the kind of "leave it to us — we know what's best" paternalism whose effects need no belaboring in these times. This attitude is unfortunate enough when directed to a general audience; when foisted on *Computerworld* in a computer-related area, it is a contemptuous underestimation of

## Letters to the Editor

### CIA Never Proposed IBM Reorganization

Bruce Gilchrist's viewpoint in the Dec. 19 issue was a very welcome one. There is no question that the user's interest must be strongly represented in any solution to the structural problems of the computer industry. The Computer Industry Association, whose membership is currently open to users of DP equipment and services, is a strong supporter of that viewpoint.

On the other hand, we have never proposed any solution to the reorganization of our industry, and not one that "IBM be broken up into seven 'Newcos.'" At a series of meetings, one of which was attended by Gilchrist, we did describe the "Newco" solution as our best under-

standing of the Federal Government's plan for industry reorganization.

The CIA firmly believes that industry and user participation is essential to any successful solution to the problem of competition in the computer industry.

Dan L. McGurk  
President

CIA  
Encino, Calif.

*Computerworld* welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, *Computerworld*, 797 Washington St., Newton, Mass. 02160.



# Systems Analysis Is Management, Not DP, Function

By Eugene C. Irvine

Special to Computerworld

K.W. Lord Jr. [CW, Nov. 21] is to be commended for attempting to shed some light on a systems/data processing problem of significant magnitude that has for too long lain dormant.

He legitimates his right to comment through his 12 years in data processing and his position as president of the Society of Certified Data Processors. I cannot legitimate my own right from such a prestigious stance, but I have spent more than 16 years in the management systems business, possess a contemporary undergraduate degree in management information systems, and am completing graduate requirements in management science.

Obviously, Lord and I view the "problem" from different perspectives. I think it fair to state that Lord, influenced by his own background and environment, perceives systems analysis as proceeding from and thus being part of data processing, whereas I, similarly influenced, perceive systems analysis as proceeding from and being part of the general management staff function.

Even thus divided, we do apparently agree:

- Something is wrong with that which is being achieved by a growing number of persons having the job title of systems analyst.
- Something is wrong with the systems analyst selection and training process.
- Something is wrong with the existing rewards system in data processing environments.

When inquiring into the nature of such statements one must inevitably consider whether it is better to reflect upon the

past, consider the present or project the future. It is only the last, I think, that has any utilitarian potential.

The view that systems analysis is a part of data processing is a widely held one, held mainly by organizations whose systems function is a strong reflection of the organization itself. That can largely be explained by briefly reviewing the phases

## Viewpoint

that management and data processing has historically gone through.

Such a chronicling will not be repeated here. Suffice it to say that those phases were both necessary and functional as they sought to accommodate the pattern of managerial and data processing development.

That accommodation, combined with the popular, stipulative definitions of the systems function that, in fact, aided only the hardware and/or software supplier — often to the prejudice of the buying company — has brought us to a point where as many as 40% of systems and data processing organizations are said to have failed to meet management's objectives. To even the casual observer, some of these systems organizations must look as if they were put together by one of the men from Indostan.

### Scientist First

It appears that some companies (and some analysts) ignore the underlying thesis that the systems analyst is, first and foremost, a scientist — an applied, nor-

mative, scientist to be sure, but a scientist nevertheless. It is only from that posture, armed with a sufficient knowledge of analytical skills (he is, after all, an "analyst"), aware of contemporary management theory and technique, and possessing a broad body of common business knowledge that the systems analyst can effectively serve either his company, his industry or his science.

I would take issue with Lord's implied assumption that the analyst source is properly the company's operating ranks or a programming school. It is exactly such an assumption plus some companies' inability to develop a "Y-path" in its career program that has produced the distorted rewards system that data processing knows today.

An authoritative study recently conducted by CCNY clearly points out that in the 1971-72 time frame, the four-year college was already the prime source for systems analysts. It also claims that by 1975 holders of graduate degrees in "systems" will have solidified their current position as the second most popular analyst source. That source is currently second only due to the lack of numbers of persons presently so qualified.

It should not be difficult therefore to project a few years into the future and see a time when the graduate schools will be the prime source.

These people, barring a currently unforeseen economic condition that will prevent it, will undoubtedly follow, if not intensify, the career profile previously defined by the Edward Warren Organization: "... at 35 years of age have 11 years of experience in four companies in three industries." It is this kind of formal

preparation and genuine experience that will enable the analyst to develop the common body of business knowledge which, when combined with his scientific method, will enable him to complete (or at least advance) that which has been left undone in his industry.

Not the least of these tasks includes the development of the formal, multi-consequence system; the abandonment of stoneage "fact-finding" techniques in favor of a greater ability to deal with an idealized concept as a design tool; the reexamination of the utility of organizational structure, as we know it; and perhaps a reorientation of the management function itself.

Further, while pleading for increased productivity, management continues to foster and perpetuate numerous policies and techniques that serve to isolate employees from the objectives of the corporate entity, and fail to achieve the degree of goal congruence that each day becomes more essential to such an entity. The properly prepared, properly utilized analyst is in a unique position to aid in overcoming these substantial problems of long standing.

It is not held herein that any doctrine of manifest destiny is operational in systems analysis today. Hope, however, does lie in the current development of internal consulting organizations, and especially in the ever-growing joining of forces between the analysts (who have not become Lord's "byte freaks") and the operations researchers who have been able to remain free of the "high priest of DP" tag.

Eugene C. Irvine is a systems analyst with the Shawmut Bank, in Boston.

## Development Depends on Interest

# Who Cares About Speed of Detroit's Election System?

J. Richard Dowell, Detroit's DP director, is confused. After spending some months working on election programs and using them very successfully last November, he found that the Detroit press (and *Computerworld*) practically ignored the matter.

By contrast, when the previous group of programs here ran into problems and delayed the publishing of the election primary result, it received plenty of public critical attention.

After his recent experience Dowell wants to know who cares about the speed of Detroit's election — and suggests that if in fact it is simply the press wanting to publish quickly, then perhaps it should pay for any speed improvements. After all, he pointed out, the candidates do not normally take office for months after the elections.

The Dowell affair may appear on the surface to be simply perpetrated by someone who feels his work has been slighted. This is not really so. To start, the new systems were not the work of a single man. Inside the department both Kenneth Fischer and T. Bruce III were heavily involved. George Dunbar of the city's election commission also worked hard on the project. Personal credit is by no means what is at stake. Instead, it is the future development of the Detroit electoral system.

If, as Dowell suspects, there is no real public interest in providing a better system, then the improvements he has planned apparently should not be implemented. So Dowell now has a technical decision to make: Should he improve the election system or let them stay as they are?

The current system involves taking readings from the voting machines, keypunching them and processing them on the computer. Processing is a batch operation with many checks and balances, which uses table-driven programs to accommodate changing voter registrations and different elections. The 1972 general election took under three hours to process from the receipt of the first returns to the completion of the last report with all precincts counted.

Intermediate reporting was handled by special reports approximately every 10 minutes to keep the press up-to-date.

### On-Line Input Eyed

Since the actual processing is already fast, the areas which could be speeded up are:

- The transcription from the voting machines to the input.
- Movement of the input to the center.
- Transcription of the input into machine-readable form.

Dowell's current idea is to see whether on-line reporting from the 1,200 precincts is practical and how much it would cost. But the immediate problem is whether it should be done at all, and Dowell would like the opinions of readers.

My opinion is that development of the election system should continue, but not necessarily in the way Dowell is thinking. The area I want to see developed is the systems planning area which seems to have made the common error of not providing adequate management information.

The whole area of systems engineering is one which nowadays seems to be satisfied if the operational systems conform with some level of user department specifications. This is not adequate. It puts the data processing department's needs so far down the totem pole that they become practically invisible.

Yet a system that is to be implemented

## An Invitation From Detroit

### CITY OF DETROIT

Data Processing and  
Management Information Services

To: Alan Taylor  
Computerworld

November 21, 1973

\*\*\*  
The true question is, who cares about the speed of this process? Is it only the press? Should they pick up the cost? After all, in most cases, persons elected or bills passed do not take office or take effect until one to two months after an election.

I would be interested in your response and the response of your readers to these points.

\*\*\*  
Very truly yours,  
J. Richard Dowell  
Director

Detroit's DP director particularly would like to hear from readers who care about the speed of the election process. Here is his invitation and the points he raises.

through data processing needs to provide effective data processing management, maintenance and development, as well as effective production in accordance with user departments' wishes.

Detroit's system, while providing effective production both of the legally required results and of the convenient results for the press, does not apparently include adequate outputs for the use of the data processing area! Again, we have an example of the cobbler's children being the last to have their shoes repaired.

Practically, this means the output should include data calculated (both from content and from the time it is issued) to attract attention to the data processing system, as well as to the election results. Such data might be:

- A statement of the improvement in election result speeds.
- A statement of the reduction of the cost of producing election results.
- A statement of the number of checks and balances added.
- A statement of how Detroit's figures

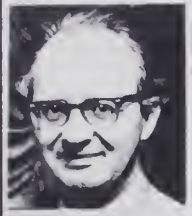
compare with other city elections.

If there is a question as to how the program might be developed, then additional material could be provided, pointing out the advantages, and, of course, the costs, that could accrue by the 1976 general election.

Then it would be possible to gauge the correct course of future development through the reactions received. Currently, however, I don't think the people who have a stake in the matter — the Detroit citizens — can be expected to react one way or the other because they simply have not been given the information in a way which brings the possible choices home to them. That is why I think Dowell does not know "who cares about the speed of (the election) process" — and that is where the next election development should be centered.

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### The Taylor Report By Alan Taylor, CDP





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## Avoid Last-Minute Panic Get Right Man for Job

By William A. Delaney  
Special to Computerworld

How can the customer or user judge a high-quality technical performance when they never see the program, only the results?

I can describe an extreme but true case of such a situation that happened to me several years ago. It was in a large commercial organization. A staff scientist went to our chief engineer and said he had a special need for a programmer and wanted a particular person from our programming organization whom he knew from previous jobs.

This scientist got the chief engineer to order me to send the programmer out on loan to work on a special job for two months. I asked for a statement of work and the opportunity to review the job with the scientist before the programmer was sent off, alone, on special assignment.

This request was denied because they said there wasn't time and also it wasn't

necessary. I tried to get a more senior man assigned to the job because the scientist (or let's say the customer) was in no position to judge programmers as good, bad or indifferent. Again I lost.

I wrote a note to the chief and said I could in no way be responsible for the work of a programmer who was no longer under my control as I would not know what he was doing or how. The chief engineer wrote back to me and said he

### Round Holes, Square Pegs

understood my "disclaimer" and he agreed. Thank heaven I had this note in my files, for as later events proved I needed it.

#### Part of Team

Anyway, off went the chosen programmer, alone and unaided. He was selected because the customer liked him and said he was well-qualified, because the programmer had done jobs well before for the customer's group. The customer was unaware that the prior performance had been done under direct supervision of our own senior staff. The man had been part of a well-organized team then, and a junior member as well.

One Friday about two months later, I received a frantic call to report to the chief engineer's office. The customer was almost breathless with rage or frustration or both because his high priority job was not completed, and his "drop dead date" was the following Tuesday. What could I do? The programmer he "borrowed" was, in his opinion, no good. The work was in a mess.

I asked again what he really wanted, and it was so simple I almost laughed (but I did not, since the chief engineer was present). All the customer wanted was a list of sines and cosines from 0 to 90 degrees, in double precision, in a table of one degree increments. I told him I would have it on his desk on Monday morning.

#### Customer Angry

Next, I called one of our senior math analysts, told him exactly what was needed. He coded up the job on Friday evening and ran it on Saturday morning. For good measure, he went from 0 to 360 degrees, in 0.1 degree intervals, and on Monday morning the table of results was on the customer's desk. The customer breathed a sigh of relief. He was saved. But he was still angry with me. I think he still is.

A funny result of this was the customer's conclusion that the man I assigned to do the job on Friday was a genius and somehow I had held out on him.

This sort of thing occurs again and again when unqualified personnel are put in a position to judge or try to judge performance in a field of endeavor with which they are unfamiliar. They simply cannot properly judge the work to be done.

The truth is that the math analyst was not a genius and the programmer was not "no good" as the customer believed. The customer had merely chosen the wrong person to do his job for him. The more junior man needed closer, almost daily supervision and he was left completely alone for almost two months. No wonder he wandered and was confused.

When I spoke to him after it was all over, he told me he still was not sure what the customer wanted him to do. He said he could not communicate with the customer or even get him to sit still long enough to get a good problem definition. As a junior person he was afraid to demand what he had a right to know in order to do his job.

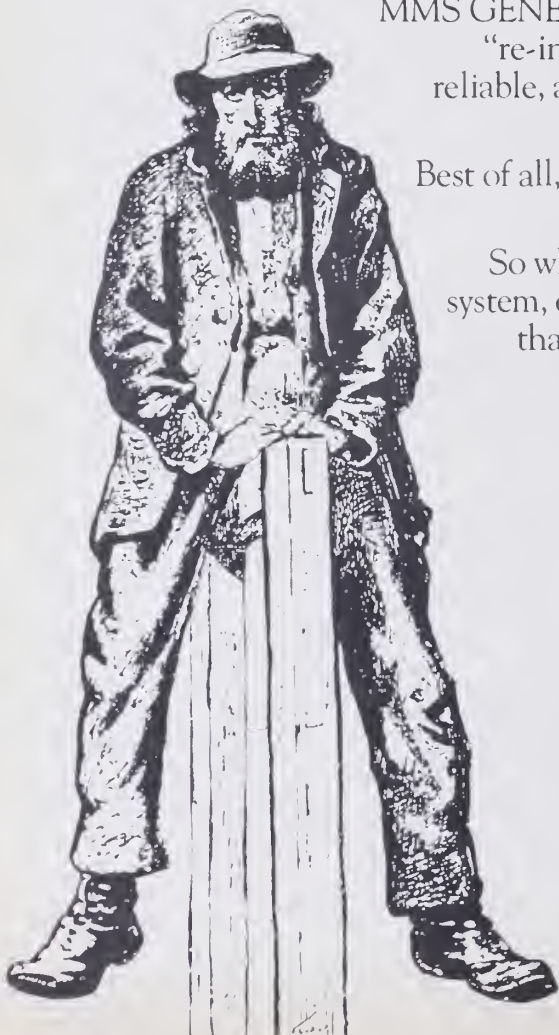
Delaney is president of Analysis & Computer Systems, Inc. of Burlington, Mass.

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## Random Notes

### Source-Source Conversions Aided by 'Tacos' Package

BEVERLY HILLS, Calif. — IBM 360/370 users who face a source language conversion problem and know logically how they want the conversion to be handled can use the Tool for Automatic Conversion of Operational Software (Tacos) package from Proprietary Software Systems, Inc.

Tacos functions under control of user-supplied conversion equations called Maps and is not restricted to any pre-defined set of original and target languages, the vendor said. It uses from 80K to 200K depending on the complexity of the conversion and costs \$25,000, from 292 S. La Cienega Blvd., 90211.

### 'Inquire' Goes Multifile

FALLS CHURCH, Va. — A multifile option for use with linked data bases will be available in the spring as part of the Inquire file management system from Infodata Systems, Inc. With the new option, the user will be able to search more than one data base with a single inquiry.

The option will also allow production of a subset data base for single or multiple files, and include multiple password protection. Infodata Systems is at 5205 N. Leesburg Pike, 22041.

### Library Access Expanded

CAMBRIDGE, Mass. — Interactive access to large-scale data bases covering such diverse areas as chemical abstracts, education and linguistics, and business, management and economics, is available to users in New England through the Northeast Academic Science Information Center (Nasic).

The project, supported by the National Science Foundation, has been initiated by MIT, and also includes access to the Medline data base through cooperation with the National Library of Medicine. Fees vary with service provided by any MIT personnel, the data base searched and the time spent at the terminal.

### TI Mini Gets Software

HOUSTON — The DX980 operating system, now available from Texas Instruments, Inc. for use on its Model 980A minicomputer, supports batch processing, interactive terminal use and real-time operations.

In addition to providing programmers with Fortran IV, symbolic assemblers and a TI language translator and linkage editor, the software includes facilities for job and task management, I/O control, operator communications and file and memory management.

The operating system requires 16K of memory on the 980A and can be installed for \$2,000. The firm is at P.O. Box 1444, 77001.

## Read/Write on Diskettes

# ACL, Flexible I/O Add Power to 3740

By Don Leavitt  
Of the CW Staff

WHITE PLAINS, N.Y. — The program logic and the extended hardware capabilities for models 3 and 4 of the IBM 3740 data entry system [CW, Dec. 26/Jan. 2] will provide users with an impressive "intelligent terminal" for a central CPU or a small, but apparently powerful stand-alone processor.

The Application Control Language (ACL) which IBM said would help users in handling data entry editing and checking applications appears to have enough power to handle many small-scale but nonetheless complex jobs. And the increased accessibility to files on diskettes, to a new line printer and to the operator's CRT complement the ACL logic potential.

IBM is reluctant to use the phrase "intelligent terminal" for the new units, but one source admitted that "previously the

3740 had been pretty stupid, not unlike a keypunch or data recorder, with a program-card facility that allowed defining field sizes and types, and an add-subtract capability."

With ACL, users now have an instruction repertoire supporting full arithmetic operations, I/O control, logical tests,

## Analysis

branching-on-condition and improved communication with the unit operator. Hardware interface changes now allow the user to process multiple diskettes and to write and read on both diskette drives, IBM noted.

This two-way interface with the files on diskettes and the availability of a line printer as well as the CRT screen give models 3 and 4 3740s much of their power. A 4K read/write memory, in addition

to a read-only memory for microcode, completes the job.

The first 1,024 positions of the read/write memory are assigned to system control and include 26, 16-position general-purpose registers. These are used to perform all arithmetic and certain logical operations; but they can also be specified for moving or formatting data for CRT display, diskette or printer operations.

### Separate Indicator Settings

ACL includes a mix of control statements and instructions and a key factor in use of the latter is an internal table of indicators similar to those used in RPG. The table goes beyond the range of most RPGs, however, by allowing up to 255 separate indicator settings.

Some of the indicators are used by the workstation control program but most are available to the user's logical operations. The instruction set permits the setting and resetting of these indicators and the testing of the settings to determine the next program steps to be executed.

The balance of memory is grouped into 128-position buffers, two of which are assigned to the CRT display unit. The remaining buffers are used to store operator messages, tables, disk file indices, program instructions and I/O areas.

Tables may be maintained in memory or on a diskette from which they would be loaded as needed.

### Three File Types

Access to the diskette files is through any of three methods, the company continued. These include support of sequential processing, relative record number or records stored under a key indexed scheme.

The ACL instruction set includes multiply and divide (coded with conventional asterisk and slash symbols), Boolean logic, Loading and Storing of registers, Shifting of register contents (right or left), and tests for character equal (or unequal) as well as tests for indicator conditions.

ACL Control Statements define the environment of the program including naming the program, the printer unit, the input source, and the buffers and formats of files, and messages to be sent to the operator as conditions arise.

ACL has been called macroinstructions that call up microcode. This suggests that in time the user-level instruction set can be extended by IBM or by sophisticated users once the makeup of the microcode logic is known.

The programmable models of the 3740 will be available in the fourth quarter of 1974, IBM noted.

DSNAME	BLKSZ	IRKAL	IRKUS	EX
GPS04.CPS2690	3825	19	5	1
GPS16.ERNMOD	6118	1		1
ICES.CDBS333	800	15		1
ICES.MODULES.ECI	7294	98	71	1
ICES.MODULES.GV	7294	41	40	1
ICES.MODULES.PROJECT2	7294	480	256	1
ICES.PROJOB	3200	735	467	1
ICES.V1M4PSDI	3076	203	86	1
INFO1.NSMBS.SOURCE	3520	380	316	1
INFO1.NSMBS.SYSLIB	3520	201	100	1

Primary Disclose report lists data sets alphabetically and shows, among other things, the block size, tracks allocated and tracks used by each.

## 'Disclose' Reports Disk Waste

CAMBRIDGE, Mass. — "Extremely readable" reports of direct access volume utilization, including volume table of contents (Vtoc) information in alphabetical order by data set name, can be produced by OS/360-370 and OS/VS users with the Disclose package from Programart Corp.

Users are provided an accounting of physical track usage sequentially by absolute track address. And, perhaps more importantly, they can also have a map of free space on a volume, and a detailed report of all Vtoc data.

Disclose can be used with multiple disk volumes during a single run and the user has control over which of the possible reports are to be produced. In addition to giving the user that flexibility, Disclose also generates its reports in less time than the "standard" utility routines from IBM, Programart said.

Three reports are produced on a volume-by-volume basis. The Data Set

Report is an alphabetic listing of the sets, including creation and expiration dates, DCB data (including record format and block size) and space allocated and used.

The Track Allocation Map shows ownership or availability of each extent of contiguous tracks, while the Free Space Map provides the opposite point of view, with a display of free space extents on a volume, and identification of the five largest, used areas.

The fourth report, the System Data Set Directory, provides a single alphabetical listing of all data sets on any selected group or all direct access volumes in an installation.

Developed by Computer System Architects, Disclose is available in source (BAL and Cobol) or object code for \$370, including documentation. Trial periods can also be arranged, a company spokesman noted from 133 Mt. Auburn St., 02138.

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# Good Use of Working Storage Can Speed Subscripting

By Reginald D. Gates

Special to Computerworld

With a little care and attention most Cobol programs can be made both smaller and more efficient. In some instances though, it is advisable to trade core for execution speed. In the example below, by increasing the core requirements just 144 bytes, an appreciable increase in speed in initializing counters and handling subscripts can be obtained.

Suppose the following entry appears in Working Storage:

```
01 L1-3YR-TOTALS COMP-3.
05 L1-YR-TOT OCCURS 36
TIMES
PIC S9(07).
```

In the Procedure Division, the program zeroes out all the totals with the following code:

```
AA120-INIT.
MOVE 0 TO XR1.
AA121.
ADD 1 TO XR1
IF XR1 IS LESS THAN 37
MOVE ZERO TO L1-YR-TOT
(XR1)
GO TO AA121.
```

Assuming XR1 is a binary, synchronized item, the coding looks fairly efficient: four verbs and one IF statement. However, it is important to realize that the program is forced to resolve the subscripted reference during execution. The generated code will follow the general pattern shown in Figure 1.

To initialize the table, (36 x 13) + 2 = 470 instructions are executed. If the table is initialized 50,000 times, 23,500,000 instructions are executed.

One possible method of initialization is to "hard code" the subscripts in the routine; e.g.

```
AA120-INIT.
MOVE ZERO TO L1-YR-TOT(01).
MOVE ZERO TO L1-YR-TOT(02).
etc.
```

```
MOVE ZERO TO L1-YR-TOT(36)
```

This results in 36 instructions, since the subscripts are resolved at compile time rather than during execution, and represents more than a 90% savings of execution time.

The most efficient method of initialization is to code the following entry in working-storage:

```
01 L1-3YR-ZERO COMP-3.
05 FILLER PIC S9(07)
VALUE ZERO.
05 FILLER PIC S9(07)
VALUE ZERO.
```

(repeat the above line for a total of 36 entries)

To initialize the counters, the code is simply:

```
AA120-INIT.
MOVE L1-3YR-ZERO
TO L1-3YR-TOTALS.
```

By adding 144 bytes to Working Storage, we have reduced the machine instructions necessary to zero out the table from 470 to 1. (One MVC will now do it nicely). If the table is initialized 50,000 times, this represents a savings of 23,450,000 instructions (23,500,000 - 50,000) - and a considerable amount of CPU time. The reduction in CPU time will more than justify the additional core.

Another way to decrease CPU time with a slight increase in core is to "hard code" subscripts

## Cobol Clinic-Part III

The clinic is a clearinghouse of ideas to make user programs more efficient. Reactions to this article and descriptions of other coding niceties are welcome, as are reports of user experience with optimizing tools and techniques.

when rolling one level of totals to another. Suppose the L1-3YR-TOTALS described previously are to be added to level 2 totals described as follows:

```
01 L-2-3YR-TOTALS COMP-3.
```

```
05 L2-YR-TOT OCCURS 36
TIMES
PIC S9(07).
```

Two methods of coding are:

```
Method A
BB200-ROLL.
MOVE 0 TO XR1.
BB201.
ADD 1 TO XR1
IF XR1 LESS THAN 37
ADD L1-YR-TOT (XR1)
TO L2-YR-TOT (XR1)
MOVE ZERO TO L1-YR-TOT
(SR1)
GO TO BB201.
Method B
BB200-ROLL.
ADD L1-YR-TOT (01)
TO L2-YR-TOT (01).
ADD L1-YR-TOT (02)
TO L2-YR-TOT (02)
etc.
```

(Continued on Page 21)

```
AA120-INIT.
```

```
MVC (Lit), XR1
```

```
Zero out XR1
```

```
AA121.
```

```
LH A, XR1
```

```
XR1 to Register A
```

```
AH A,(Lit)
```

```
Add 1 to Register A
```

```
STH A,XR1
```

```
Save incremented XR1
```

```
LH A,SR1
```

```
XR1 to Register A
```

```
CH A,(Lit=37)
```

```
Compare
```

```
L R15,Address
```

```
Set up
```

```
BR somewhere
```

```
Branch Not less than
```

```
LH Z,XR1
```

```
XR1 to Register
```

```
SH A,(Lit=1)
```

```
Adjust for zero start
```

```
MH A,(Lit=length)
```

```
Multiply by length of WS entry
```

```
AR A,(Address)
```

```
Add address of start of table
```

```
ZAP (Lit=0), Address in A
```

```
Zero and add zero to address pointed at by register A
```

```
L R15,Address of AA121
```

```
Branch back to beginning
```

```
BR to R15
```

## Datapoint 1100 processor based systems



Remote Batch Terminal



Intelligent Terminal

## Datapoint 2200® processor based systems



Remote Job Entry



Terminal Processor

## Datapoint 5500 processor based systems



Local Processor



Remote Processor

The pictures indicate a typical growth pattern of 1100-2200-5500 usage as a field office's work load increases. In the left-hand column, normal progression begins with the Datapoint 1100 for Remote Batch Terminal applications. In this mode, card readers, tape units, communication equipment, and printers are utilized as peripheral devices for efficient transmission of data between the remote location and host computer. In the second phase, the Remote Batch Terminal operation is upgraded to a 2200 to provide stand alone processing power to expedite Remote Job Entry applications. In addition to the expanded processing power of the 2200, disk copability and RPG II substantially enhance the effectiveness of the 2200 used in this way. In the third phase, a stand alone Datapoint 5500 is utilized as an independent Local Processor to meet all the dispersed processing requirements of the remote site without relying

on a central host facility.

In the right-hand column, the first picture shows the Datapoint 1100 used as a powerful Intelligent Terminal for data entry and limited processing tasks. In the next phase, field office needs have grown to an Intelligent multi-station requirement and are satisfied by the Datapoint 2200 used as a Terminal Processor. In this mode, a single Datapoint 2200 can provide "intelligence" for up to eight keyboard/display stations with subsequent transmission of data between the host and remote sites. The final progression is to the Datapoint 5500 Remote Processor, used in field offices as local "computer utilities" still linked to the host processor system, but now providing substantial independent compute power of their own to an array of peripherals and terminals located in the field offices.

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## A Good Plot

LAFAYETTE, Calif. — More than 200 application programs that are available for use with Zeta and most other plotting systems have been cataloged by Zeta Research as part of its Plotter Program Referral Service.

Purpose of the service is to put companies interested in plotting displays in touch with companies that have already developed programs for sale, a Zeta spokesman explained. The routines already cataloged are "extremely diverse," he added.

Zeta is at 1043 Stuart St., 94549.

# \$500 Package Handles Retrieval Chores

DURHAM, N.C. — IBM 360/370 installations working under OS or DOS can handle generalized information storage and retrieval chores easily with a package now available from the National Laboratory for Higher Education (NLHE).

The new offering is an adaptation of an IBM 1130-oriented system developed in 1971 through the joint efforts of NLHE, Furman University, Greenville, S.C., and Clark College, Dubuque, Iowa.

The system has been designed with the DP neophyte in mind and reports can be generated by a few commands without help

from a professional programmer, laboratory spokesmen said. The package includes support for statistical reports such as frequency distributions, correlations and tabulations on all or part of a file.

The NLHE package also incorporates the ability to print or punch fields in the order required for an arbitrary report after the selecting and sorting of records from a disk file.

Its regular use would provide users with a standard set of programs for updating and maintaining disk-based data, the spokesmen noted.

The package, written in Fortran, requires 100K bytes of storage and is available in source

form, with appropriate documentation, for \$500 from NLHE at Mutual Plaza, 17701.

## Working Storage Use Speeds Subscript Code

(Continued from Page 20)

ADD L1-YR-TOT (36)  
TO L2-YR-TOT (36).  
MOVE L1-3YR-ZERO  
TO L1-3YR-TOTALS.

From the preceding discussion, it should be easy to recognize that Method B takes a little more core but much less CPU time. The actual savings is

greater than the 470 to 1 ratio of the first example.

Gates is a senior business systems programmer at McDonnell Douglas Automation Co. in Huntington Beach, Calif.

## People Included In Project Plan

NEEDHAM HEIGHTS, Mass. — Managers in the construction industry, job shops, manufacturing plants and professional departments can gain better control of their manpower-dependent projects with the Layla scheduling system from ECI Software Corp.

Since project planning is not necessarily a daily requirement, the system is available on a time-sharing network or as an in-house package running on a Decsystem-10. The package produces schedules from either a Critical Path Method (CPM) or Pert analysis, a spokesman said.

Although these techniques have been used in the past, they have generally focused on time constraints. Layla adds a data base of manpower resources.

The system allows the user to simultaneously schedule multiple projects in a limited manpower environment and to allocate manpower to specific activities within projects.

Written in Fortran, the large-scale system utilizes overlays extensively and fits in 12K.

ECI Software is at 87 Crescent Road, 02194.

## Dispersed data processing the Datapoint way — as easy as 1100-2200-5500



Dispersed data processing the Datapoint way is the productive, economic approach to providing your field offices with the on-site computer power needed to compete in today's business world, while yet being linked to a central computing operation. Datapoint's trio of upward-compatible dispersed processors—the 1100, 2200 and 5500—offer you a capability that can be readily and painlessly augmented as office work load increases, as your company's communications network becomes more sophisticated and your field office personnel more knowledgeable.

Let's look at these processors: the Datapoint 1100, available with 4K or 8K central memory, is the new Intelligent Terminal system from Datapoint Corporation that can bring your field offices into the on-line computer age immediately. Competitively priced, and with extensive capability for business processing tasks such as on-line (or off-line) data conversion and entry, it is a basic building block for creation of a multi-use dispersed data processing and data handling capability in your field offices. Once installed, the 1100 can double duty for progressively more sophisticated data processing and data communications assignments including

remote batch applications through utilization of card reader, magnetic tape, and printer peripherals. In software, Datapoint provides a CTOS operating system, Assembly Language, and the new DATAFORM language for sophisticated data entry and editing. Initial deliveries of the 1100, with a monthly lease price of \$138, will begin in January.

When your field office work load grows beyond the capability of the 1100, it is an easy, painless transition to a more powerful Datapoint processor, without the need for jarring systems redesign and expensive software revision. The secret is in the upward compatibility of the 1100 with the well-established Datapoint 2200 Terminal Processor and the new Datapoint 5500 Remote Processor. It is as simple as pulling the plug on the 1100, plugging in the 2200. No complex systems changeover, no costly software rewriting is entailed; the user obtains the needed increment in dispersed data processing power in his field offices without disruption. The 2200, a widely used and well-established system with up to 16K central memory and dual ECMA standard cassette drives, will do everything the 1100 will do, and also provide an expanded on-site computer power. In a multi-station mode, it can service up to eight low-cost terminals for data entry and related tasks.

The 2200 is a natural step towards the 64K Datapoint 5500 Processor (deliveries in third quarter, 1974), which will do everything the 2200 does and also constitutes an on-site "computer utility" in your field offices. This system will provide computer power for a large number of associated peripherals and for a variety of low-cost, non-programmable terminals while simultaneously furnishing a high

speed link to a central computer facility. These three Datapoint communications-oriented dispersed processors, progressively larger, faster and more powerful, open a new world of capability to the network-oriented user who sees the need for a growing satellite computing capability in his field offices, while still accessing a central computer facility for heavy duty processing and primary file storage.

Chalk up another innovative approach from Datapoint Corporation to the solution of business data processing problems. With the versatile Datapoint 1100, the proven Datapoint 2200 and the powerful Datapoint 5500; with their associated peripherals including line and serial printers, 7- and 9-channels magnetic tape units, a cartridge disk system, and synchronous and asynchronous communications adapters; with full operating systems and extensive programming language capability including RPG II, BASIC, DATABUS and others under development, no other source can serve your dispersed data processing and field data handling needs so effectively, so economically. For further information on the growing Datapoint family of dispersed data processing systems, peripherals and software, contact the sales office nearest you or write or call Datapoint Corporation, San Antonio, Texas 78284, (512) 696-4520.

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## Limited Bisynch Support

# IBM Unveils Some Facts About SDLC

By Ronald A. Frank  
Of the CW Staff

WHITE PLAINS, N.Y. — Binary synchronous terminals will not be totally incompatible with IBM's Synchronous Data Line Control (SDLC) communications networks, although their use will be restricted.

This was one point made by IBM's W.J. Teagarden during a discussion of the impact of SDLC on the communications user.

Teagarden, product administrator for the teleprocessing systems marketing department at IBM, said the major use of SDLC based on currently announced equipment will be to control the link between the user's remote data concentrator or front end and the central site controller.

IBM currently will support SDLC on its 3704 and 3705 in addition to using the line protocol on the terminal concentrators for its finance, retailing and super-market point-of-transaction systems.

In a host/slave relationship between two 370Xs, the connection link between the remote site and the central site will utilize SDLC, Teagarden said. In such point-to-point full-duplex links, the SDLC protocol will allow the user to eliminate some of the acknowledgement sequences now required with bisynchronous transmissions, he said.

### Continued Equipment Use

But the real significance of this type of configuration will be apparent to the bisynchronous users on the terminal side of the remote 370X. The terminals can be connected in half-duplex mode into the remote 370X thereby allowing continued use of existing equipment, Teagarden said.

At the central site, the teleprocessing access method can reside in both the mainframe and the 3705, Teagarden said. "There are a lot of pieces" to the access method, he said. The "pure accessing is in the Network Control Program (NCP)" which resides in the 370X but the total access method has to be a combination of Virtual Telecommunications Access Method (Vtam) and NCP.

Systems presently announced for use with SDLC are compatible only with Vtam and 370 mainframes but some support will be available for Tcam users, Teagarden said.

"Tcam will be supported through Vtam which will take out part of the line interface mechanism at the bottom end of Tcam and that will then be interfaced with Vtam," he explained. "The function portions of Tcam will utilize the access portions of Vtam," he added. "I would expect Tcam users to utilize Vtam and take advantage of SDLC if the require-

ment exists," he said.

"In the case of Tcam, we are adding functions optionally in response to customer needs. Buffering, routing, these kinds of things, are being added to the access method. What we are doing with access methods today is considerably more than we were doing with a rudimentary access method such as Btam," Teagarden said. SDLC will not be compatible with Btam, he added.

The typical large teleprocessing network user has a considerable amount of work to do that is related to the management of the network and not related to his application, Teagarden said. Tcam allows

the user to do less of these management functions, thereby freeing the TP programmer to do more "purely productive applications things," he said. Both Tcam and Vtam are "high function systems," he added.

For the access methods to do more of the network management functions, Teagarden admitted that "yes, they are going to use more core to do the total job and a major chunk of that will certainly be moved out to the 370X." Exactly how much of the teleprocessing software overhead will be moved from the 370 to the 370X will depend on the number of modules being utilized by the user.

## DEC Adds 2780, Hasp Packages For PDP-11 Communications

MAYNARD, Mass. — Digital Equipment Corp. has introduced two remote communications software packages for its PDP-11 line of minicomputers.

The new software which joins Digital's Deccomm series of remote computer systems (RCS) includes an IBM 2780 emulation package for use with the PDP-11 disk operating system (DOS-11) and an IBM Hasp workstation package.

The 2780 emulation package (DOS/2780) supplements a core-only 2780 PDP-11 system previously available. DOS/2780 is designed to transmit and receive unit record (punched card, line printer) data between PDP-11 disk, mag tape or Dectape and a central IBM 360 or 370 running OS/ASP, OS/Hasp or OS/RJE systems or another PDP-11 facility which emulates or supports 2780 Model 1 remote batch terminal operation.

The RCS Hasp package permits transmission of jobs prepared on punched cards over leased or switched lines to an OS/Hasp or OS/ASP system for processing and simultaneous reception of output from the central system on a line printer.

The RCS Hasp program running in the PDP-11 manages communications so that it appears to the operator that he is working directly with the central system.

Both the DOS/2780 and Hasp workstation packages can be used with any PDP-11 processor. Each system is available under a license from DEC. The license price of each software package is \$2,000, available now.

## AT&T, Specialized Carriers Joust A Bit at Seminar on Competition

By Ronald A. Frank  
Of the CW Staff

NEW YORK — Communications users recently had a first-hand look at the verbal war over private-line services raging between AT&T and the specialized common carriers.

The carrier warfare based on the new competition from the specialized carriers was heatedly discussed by AT&T officials

and representatives from almost all the other carriers at a seminar here sponsored by Paul Kagan Associates, Inc.

The featured speaker at the session, Bernard Strassburg, chief of the FCC's common carrier bureau, said the commission intends to continue its policy of fostering the development of the specialized carriers. Strassburg, who retired at the end of December, said there had not in any way been "a change of heart" on the part of the FCC despite Bell's pleas to reexamine the long-term effects of the specialized carriers.

### It Takes Time

Answering Bell's claims that the new carriers were offering services that were carbon copies of AT&T services, Strassburg said no one could expect the specialized carriers to have "dramatically new services from day one." One drawback to innovation is the fact that users have been "totally conditioned" to Bell hardware and communications facilities, he said.

Bell has voiced "unfounded concerns" that competition from the specialized carriers

(Continued on Page 24)

## FCC Rulings Hit AT&T Policies

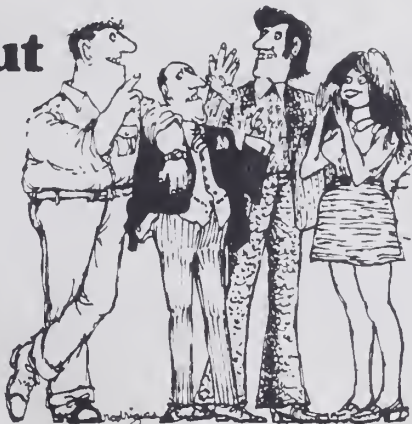
WASHINGTON, D.C. — The Federal Communications Commission has issued two rulings designed to eliminate AT&T roadblocks against the specialized carriers.

The commission ordered AT&T to "show cause" why it should deny or delay unreasonably "physical connections with MCI" for authorized and pending interstate services. The connections refer to local loops which Bell companies have been required by the FCC to provide to Microwave Communications, Inc. and

other specialized carriers.

The commission also ordered Bell to show why it was altering its agreements with Western Union to treat it as a specialized carrier by charging it higher rates; why it was filing tariffs with state regulatory commissions for interstate services; why it was denying MCI the type of "interconnection privileges" it normally provides to AT&T Long Lines; and why it was filing domestic satellite interconnection tariffs with the states instead of the FCC.

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# AT&T, Specialized Carriers Square Off on Competition

(Continued from Page 23)

riers will cause higher rates on other services, the outgoing FCC official said.

He conceded that Bell had won many "brownie points" with customers because it offered flat rates, but he suggested that any "objective economic appraisal" by AT&T should include an evaluation of "measured or disciplined" charges for all services.

Urging the specialized carriers to continue their fight against AT&T's regulatory roadblocks, Strassburg called for a "limited association" of specialized carriers to foster "collective action" against the Bell System.

## 'Favorite Ogre'

Echoing Strassburg's opinions, Doug Johnson, vice-president of Western Telecommunications, described AT&T as "our favorite ogre," and asked attendees, "How do you compete with a superpower?" Johnson said his company was testing a new local loop technology that operates at 38 GHz for Continental Airlines on the West Coast. If successful, the new method might enable Western Telecommunications to provide local loops to users without having to rely on local phone companies, Johnson implied.

Speaking for N-Triple-C, which is planning to merge with MCI, David Stevens said his firm had provided new service to 18 customers within the previous month despite the fact that some local loops from Bell were being delayed up to eight months.

Datran was represented by Vice-President Ralph Johnson who said 29 transmission sites in the company's digital data network had already been completed.

Burroughs will supply the Digital Communications Console required for users to interface with the Datran network. Datran would offer just lines or a complete communications manage-

ment service, depending on the needs of the user.

Fox Stoddard, marketing director of AT&T, said "if the rules are fair" Bell is ready to compete for intercity services.

In listing new services being considered by AT&T in response to competition, Stoddard said Bell "operating companies are also examining intrastate intercity private-line service offerings."

[It is believed that Pacific Telephone & Telegraph is ready to propose an intrastate Digital Data Service (DDS) network in

California but an AT&T spokesman said he had no knowledge of such a proposal.]

MCI Vice-President Carl Vorderbruegge told the attendees the final outcome of the competition between the specialized carriers and AT&T will be decided by customers in the marketplace and not in the courts. He revealed that 12 MCI customers have already explored the possibilities of using local-loop systems not provided by the local phone company. None has yet gone this route because of the cost involved, but he predicted the first of these systems

would be built soon.

At a related session held later, MCI Board Chairman William McGowan charged that AT&T was in violation of the U.S. anti-trust laws because it is protecting its long-lines division against the competition offered by the specialized carriers. He also charged that AT&T's current advertising violates the law.

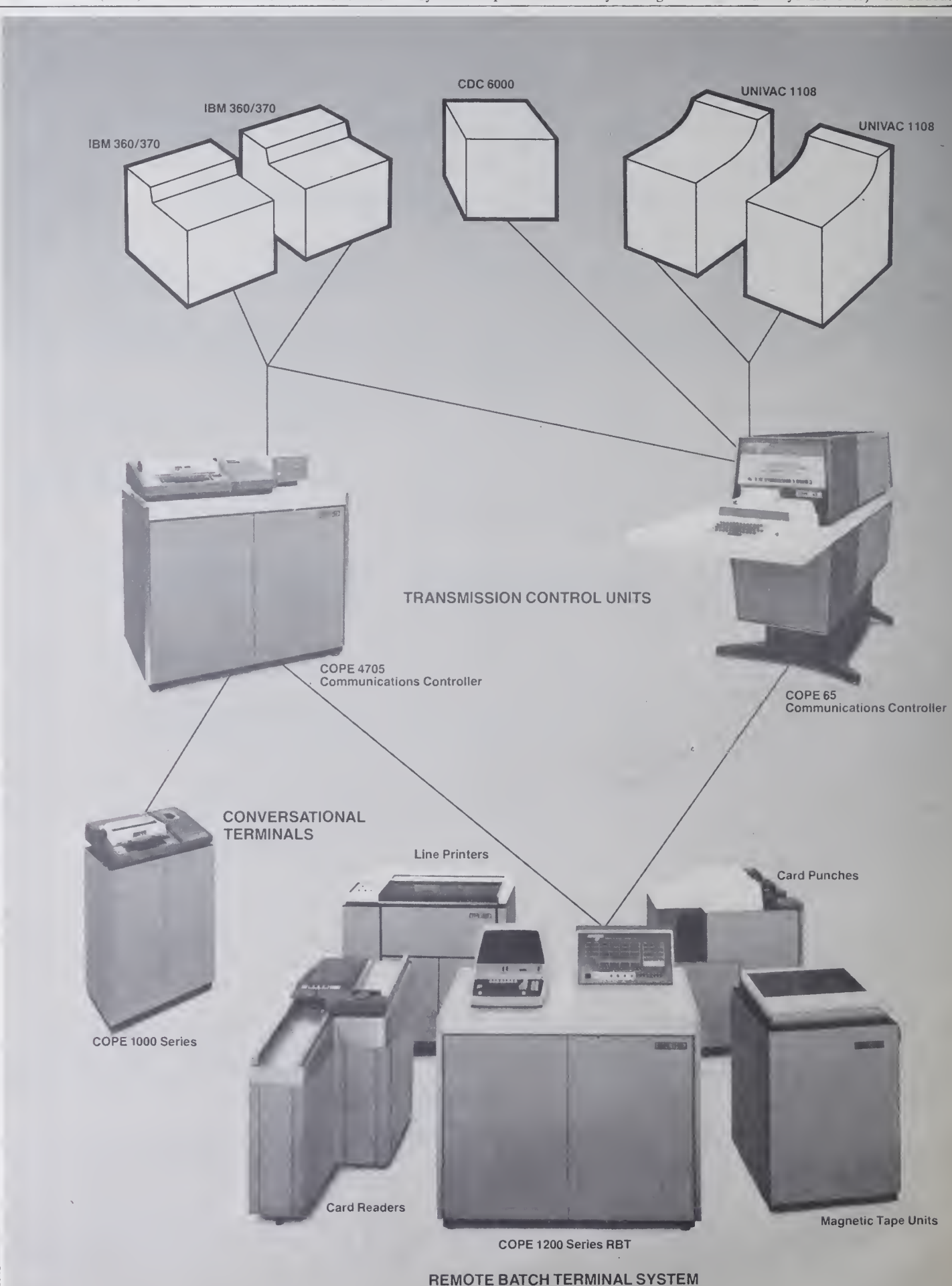
## No Return

"Users are going to insist on these new [specialized carrier] services," McGowan said, "we shall never return to the status quo of several years ago. The

users will not allow it."

Answering AT&T's recent claims that interconnection with the specialized carriers will be harmful to the phone network, McGowan said Bell has inter-connected with 1,800 independent telephone companies for many years "without affecting the harmony of their network."

Datran President Glen Penisten told the attendees his company had changed its philosophy in several areas. It now plans to use phone company local loops instead of providing end-to-end service. "The 'Alice in Wonderland' days are over," he added.



Sherry Says...



The Data Communication Forum

House calls may be a thing of the past for family doctors, but they're an everyday event for the field engineers in Bill Frala's ICC Customer Support team. Bill knows that an ailing data communication system just can't wait for "visiting hours", so he offers 24 hour on-call service. If the problem can't be cured by phone consultation, ICC customers can order on-the-spot T.L.C. for their systems.

• I've decided what to send my friends in the communications industry for Christmas. It's Bruce Howat's "Great Moments in Communication". This book is a biggie!

## Oldies But Goodies

Some of the early models of ICC modems have been in use for so long, they'll soon qualify as collectors' items. Of course, Matt Kenny and his sales troops won't let that happen. They're showing our customers the advantages of the newer ICC modems that offer all kinds of great features. They're in our latest catalog. Why not send for a copy.

If you have questions or topics you would like to see in our column, send them to: "Sherry Says" c/o: International Communications Corporation 7620 N.W. 36th Avenue Miami Florida 33147

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12/73



# Upgradeable POS System Answers Store's Needs

By Patrick Ward  
Of the CW Staff

ST. LOUIS — The question facing the management of Schnuck's Markets a year and a half ago was, "Will we buy obsolete electromechanical registers, or will we try to get into the new electronics that would conceivably be upgradeable in the future?" according to Douglas Brookings, vice-president, operations, for the food store chain. Schnuck's decided to try point-of-sale (POS) equipment in a new store and began looking for a system both modularly upgradeable to scanning, and one which could offer a relatively

short-term return on investment — between 15 and 20 months.

The company chose MSI Data Corp.'s Astros system because of the firm's software capabilities.

## Scanning Main Goal

Schnuck's was not just interested in replacing "a register for a register," Brookings said, but was looking for a system that provided opportunities for productivity improvement, cash control improvement and opportunities to expand the system toward the ultimate goal of scanning.

Schnuck's also wanted some-

thing acceptable to the customer, sales slip and all, Brookings mentioned.

From its POS systems, now installed in two stores, Schnuck's gets reports relative to sales, inventory and total cash with information on cash within the store, whether in coupons or gift certificates, for example.

Every transaction is recorded and logged to a particular register and checkout cashier, Brookings stated.

The system allows the store manager "to go in and press buttons and say how much money... have I got in the register. Do I need to make a pickup, do

I need to put more money into that register?"

Since Schnuck's does not yet use scanning, most of the items are marked with a price, rather than coded. Keying in a price is quicker than a code number, Brookings explained.

But if an item is coded, "a manager can go into the system and say, 'I want the movement on this item,' and you can find how the item sold in specific time periods or over the whole day," Brookings mentioned.

This allows monitoring advertised or coupon items, he noted.

Store managers access the system through a Model 33 ASR

TTY installed in their offices. The manager uses a control to get into the system, then calls up a particular program, like product file.

Each store has two minicomputers ("with complete redundancy") with a program to handle outages and provide automatic startup later.

As installed the Astros system consists of a register unit with a

## User Casebook

10-key pad and an 80-key velocity area for fast-moving items that must be weighed.

Customers bring items to the checker in carts which the checker unloads, while keying prices into the 10-key pad.

But with a produce item sold by weight — peaches for example — the checker puts the item on a scale that weighs to 1/100th of a pound, and presses "peaches" in the velocity area.

The system calculates the weight and price and shows this information along with the item name on the display. This feature eliminates the need for personnel in other departments to weigh products, Brookings said.

Schnuck's uses product numbers only on selected items in a store, and for "those departments that we want to control."

After testing the POS system, Schnuck's bought the equipment and has decided to equip all new stores with electronic registers, Brookings revealed.

For a new store, he stated, it is projected that the capital investment over electromechanical registers is offset within a 14- to 17-month period.

Eight mechanical registers would cost about \$21,000 to \$22,000 Brookings calculated.

A similar Astros system costs about \$51,000, Brookings said. This includes seven registers in the front of the store (replacing about 10 electromechanicals); a register in the office for returns; bottles and so on; the manager's terminal; and the processors.

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## **dawn of a new era**



## IBM Extends 3700 Series

By Don Leavitt  
Of the CW Staff

WHITE PLAINS, N.Y. — The IBM 3790 communications system, with self-contained programmable logic and a potential for nearly 28M characters of fixed-disk storage, can control as many as 16 terminals operating concurrently on one or more applications.

The system can be linked to virtual storage models of the IBM 370 line, excluding the Model 115, providing remote users with access to the data and processing power of the mainframe. Additionally, the stand-alone capabilities of the system allow users to process transactions more completely at the remote sites, freeing the central CPU for other tasks.

Key to the newly announced member of the 3700 family is the 3791 controller, a programmable unit that manages all message traffic between the remote terminals and the host computer. The controller gives users disk storage ranging from 4.8M to 27.5M characters for application programs and local data files.

The controller supports interactive communications with the host computer to assure on-line response to items requiring immediate attention, but also allows data to be recorded on removable diskettes for batch transmission to the central CPU during non-peak hours, IBM noted.

Up to four IBM 3793 keyboard printers, a newly modified IBM Selectric II with operator guidance controls, eight IBM 3277 CRT display stations and a 120 line/min printer can be attached to the 3791 controller. The system can be further expanded, the company said, by attaching 3792 auxiliary control units which can support an additional printer and other 3793s, and can control 2741 communications terminals at remote sites.

Terminal operators can choose from user-written application programs stored in the controller. Each operator can use a different program or several operators can use the same program simultaneously.

Because the system uses programs that are generated and tested at the host computer installation, programming capability at branch locations is unnecessary.

The 3790 will be available in the first quarter of 1975 and will operate under Vtam and DOS/VS, OS/VS1 and VS2. Monthly rental would be \$2,817 for a 3791 with 27.5M characters of disk storage, four 3277 display stations, two 3793 keyboard printers and a line printer. This configuration can also be purchased for \$103,330.

## Independent 3330s Plug Into 125 DDA, 135 IFA

SANTA CLARA, Calif. — Users of IBM 370/125s and 370/135s can attach Memorex's 3673, 3330-type disk controller to the 125's integrated Direct Disk Attachment (DDA) or the 135's Integrated File Adapter (IFA) to allow use of Memorex's 3330-type disk drives at up to 25% savings over IBM's equivalent equipment.

Complementing the 3673, Memorex also introduced the 3670 disk drive Model 2 which provides a single spindle of 100M-byte capacity as an alternative to the standard twin-spindle module Model 1.

	IBM 3340 B1	Memorex 3670-2
Capacity (Mbyte)	70	100
Transfer Rate (kbyte/sec)	885	806
Average Access (msec)	25	27
Cost/mo (2-yr)	\$475*	\$600**
*Packs rent at \$70/mo each.		
**Packs rent at about \$15/mo each.		

Specifications contrast IBM 3340 with Memorex 3670-2 disk drives.

Previously, independent 3330-type disk drives required attachment to a CPU channel through the independent's own storage control unit. Because the 370/125 does not provide high-speed channel capability, users were previously prevented from selecting independent disks as an alternative to IBM offerings. By providing an interface to the 370/125's DDA, the 3673 eliminates the need for a channel and separate storage

210M Bytes (IBM)	
3340A2	\$850
RPS option	20
3340 B1	475
RPS Option	16
6 packs (\$70/mo each)	420
	<u>\$1,781</u>
200M Bytes (Memorex)	
3670-1	\$1,000
3673	265
4 packs (\$15/mo each)	60
	<u>\$1,325</u>

Cost Comparison for 200M-byte systems.

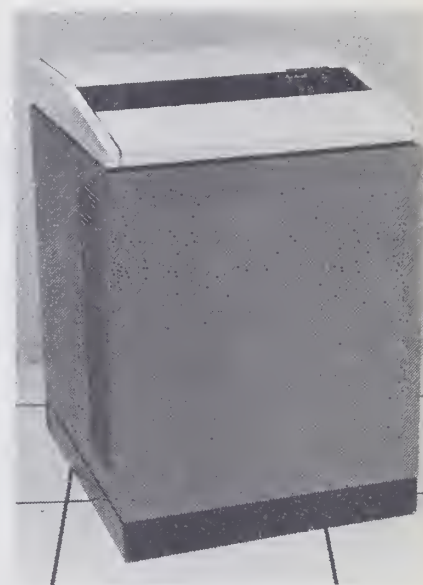
control unit, the firm said.

The 3673 also attaches directly to the 370/135 IFA, providing a lower-cost alternative to channel attachment of the 3670-series disk subsystem.

For users desiring higher performance and greater capability, the firm said, channel attachment through the 3671 storage control unit will also continue to be offered. The 3673 provides attachment only to the 125 and 135, with attachment to larger models of System 370 through Memorex's 3671 controller.

The 3673 disk controller is plug-compatible with the IBM 3333 models 1 and 11.

The 3673 controller provides an optional string switch capability, allowing the 3673 and attached drives to be switched either manually or under program control between the integrated attachments on two different CPUs, either 370/125 and/or 370/135.



3673 Disk Controller

The 3673 controller leases for \$265/mo on a two-year lease, and the 3670-2 drive leases for \$600/mo on a two-year lease. Deliveries are scheduled within six months from the company at San Tomas at Central Expressway, 95052.

## Book Review

### Contract Clauses Recommended

By Vic Farmer  
Of the CW Staff

PRINCETON, N.J. — While other user groups, tied to the apron strings of their vendors, have been reticent to take stands against vague vendor hardware contracts, representatives of colleges and universities have banded together, compared and worked over what protection they, as users, need in a DP contract.

The result is a 156-page book that provides a checklist to aid users in writing their own contracts with vendors.

The Interuniversity Communications Council, Inc. (Educom) established this task force in the spring of 1971 realizing that educational discounts to institutions were slowly being cut down and in some cases eliminated. More and more institutions have, accordingly, begun to write individual contracts for the purchase or lease of computing systems as they seek to make each dollar count.

Over 170 clauses were drawn from real contracts, used previously by universities to illustrate the 31 key types of clauses that should be included in most contracts for hardware.

The introduction of *Contracting for Computing* carefully points out the examples that reflect special conditions within the contributing institutions and

warns:

"A good contract requires the addition of particular terms and conditions that you and your counsel will include.

"It is not the intent of the authors to offer the descriptions or examples as substitutes for competent legal advice."

Those admonitions aside, however, the authors systematically run through a comprehensive list of clauses sure to bring a sparkle to the eye of a lawyer unfamiliar with DP: delivery dates, installation dates, installation, maintenance, related document delivery, site preparation, software preparation, standards of performance and acceptance, transportation of equipment and vendor liability.

Also covered are alterations in hardware, assignable rights, attachments, cancellation, conversion, emergency equipment, insurance, liability, maintenance, patent indemnity, payment, prices, purchase of installed rented equipment, relocation, software, supplies, taxes, technical services, title and training.

The book, authored by Harry B. Rowell Jr. of Carnegie-Mellon University and Carolyn Landis of Educom is priced at \$15, and is available through Educom, Post Office Box 364, 08540.

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## IBM Energy Management System May Give Utilities an Edge

WHITE PLAINS, N.Y. — A computer-based Energy Management System that allows electric utilities to produce power more efficiently — and may help conserve fuel — has been announced by IBM, but it won't be ready until late this year.

The system combines IBM/370 virtual storage and System/7 computers with a set of special application programs, data collection and display units.

The components that make up an Energy Management System, which can be tailored to the customer's specific requirements, are:

- Remote data acquisition and control station that is designed to monitor and control up to 320 sensor input/output devices through a teleprocessing link with a S/7.

- Color control unit that contains logic and storage for attachment of two user-specified TV displays. The unit allows a dispatcher to interact with a medium or

large-scale Energy Management System.

- S/7 energy management system, a program product that controls central stations and helps maintain network frequency and economic operations in smaller energy management systems. In larger ones, the program provides a link between remote locations and the S/70s installed at the main control center.

- System 370 energy management system, a program product that allows data stored on a S/7 to be processed by a virtual storage System 370 and entered into the larger computer's data base. Like the S/7 energy management program product, it has options — for the larger utility — that help a dispatcher monitor and control the power network.

- Special real-time operating system, a program that operates under OS/VS1 to provide a highly responsive and reliable real-time environment for energy management applications.

- Display management system, a program that supports the 5985 color control unit.

Equipment in the utility's power plants can be linked, through communications lines and the new 3707 control stations, directly to a computer which can automatically check and display their status on the dispatcher's screen.

First customer shipments are scheduled to begin in the fourth quarter of 1974. The purchase price of a smaller system used only for supervisory control, which can include a single S/7, 10 3707s and IBM-supplied programs and installation services, would be about \$400,000.

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The OpScan 37 has an especially interesting work and time saving feature. You can program the

system with just a single form. To change applications all you need to do is insert a type-written page. It's as simple as that.

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## Tape Data Protected

ROCHESTER, Ind. — Magnetic and physical protection is provided for a reel of 1 inch tape with diameters up to 12 inches or for two half-inch-wide tapes by Ad-Vance Magnetics' TDP-116-R15P AD-MU tape data protectors.

The loaded tape container can be dropped four feet to a concrete surface without either damaging the tape contained inside, or unlocking the fastener lock which is designed for instant locking or unlocking, according to the company.

In 10 to 15 unit quantities, the price is \$28 each and the price is \$19 in 100 unit quantities.

Ad-Vance Magnetics is at 226 E. Seventh St., 46975.

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## Floppy Disk With FDOS

The Daconics Corp. Model 1280 floppy disk subsystem for use with Hewlett-Packard 2100 Series minicomputers is supplied with two drives, all necessary interface/controller electronics and cables, and a disk operating system software package called FDOS. The Model 1280, including FDOS, is priced at \$4,795. Daconics is at 925 Thompson Place, Sunnyvale, Calif. 94086.

## \$7,950 Printer Added to HP Line

PALO ALTO, Calif. — Hewlett-Packard has announced the HP 12987A dot-matrix subsystem which prints 132 column lines at 200 line/min and costs \$7,950.

The printer system is compatible with HP 2100 Series DOS, BCS and SIO-based software and includes the printer with detachable stand, interface card and cable, system software, diagnostic and operating and service manuals.

Designed to give up to six copies at low noise levels, the heart of the print mechanism is a one-piece 132-tine steel comb. Each tine is electromagnetically actuated to print a dot in its

column. A standard 5 x 7 matrix prints a 64-character set (standard Usascii code) by indexing the comb across five horizontal positions for each of the seven vertical paper steps.

An optional 5 x 9 matrix with a 128-character set (full Ascii code) prints two additional dot rows below the baseline to provide descenders for distinct lower-case printout. This option costs \$500.

Speed is reduced to 165 line/min when lower-case characters are printed. However, the printing rate for both character sets is constant regardless of line length.

Deliveries will begin in February.



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## Printer/Plotters Do Either, Both

PALO ALTO, Calif. — Varian Data Machines has announced two electrostatic printer/plotters that can either print, plot or do both simultaneously. One of the new devices provides an 8-1/2-inch-wide output, the other an 11-inch-wide output.

The 8-1/2-inch Statos 31 features a writing width of 8 inches, an 80-column, 64-character alphanumeric output in a 5 x 7 dot matrix font, and printing speeds over 1,000 line/min. For plotting it features a paper speed of 2.75 in./sec.

The 11-inch Statos 31 features a writing width of 10.56 inches, a 132-column, 120-character alphanumeric output in a 7 x 11 dot matrix font, and a printing speed of 1,000 line/min.

For plotting, the 11-inch Statos 31 features a paper speed of 2.2 in./sec.

Both plotter/printers provide optionally a hardware character generator that can print alphanumerics in two font sizes and in four orientations — vertically, horizontally, upside down and backward.

An additional line buffer is offered optionally to enhance overall system operation. Higher printing and plotting speeds are also available optionally.

Output from both devices can be either roll or fanfolded paper.

The systems will range in price from about \$7,000 to \$8,000, from the firm at 2722 Michelson Drive, 92664.

## Faster Fortran IV For FP-07 Processor

PORTLAND, Ore. — Floating Point Systems, Inc. has released faster Fortran IV software with its FP-07 series processor with floating point hardware for Nova and DEC minicomputers. The complete hardware and software package sells for \$5,000. It compiles with 12K memory.

Documentation and a users manual are available from 3160 S.W. 87th Ave., 97225.

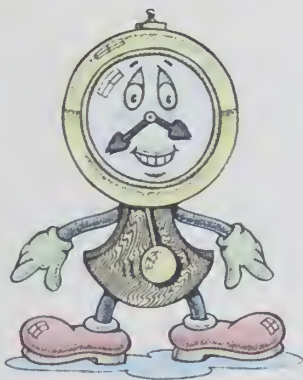
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**System 2400.  
It earns its place  
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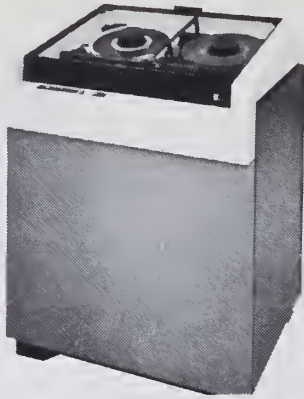
**Mohawk Data Sciences**

**MDS**



## MDS Tape Drive Features Include Automatic Load

UTICA, N.Y. — Mohawk Data Sciences Corp.'s Model 4010 tape transport is a 75- to 125 in./sec drive with automatic tape threading and optional cartridge loading. It is configured in a compact, slope-front cabinet, and offers single capstan drive,



Mohawk 4010 Tape Transport

about \$6,000 in OEM quantities. The company can be reached through Box 362, 13503.

### New OEM Products

vacuum buffering with linear-optical servo control, 500 in./sec rewind and air bearings at all tape turnaround points.

Recording format options are: 200/556/800 bit/in. NRZI (7-track), 800 bit/in. NRZI or 1,600 bit/in. phase-encoded (9-track) or dual-density 800/1,600 bit/in. An off-line test capability is incorporated into all models.

The Model 4010 is priced at

## Datos 305 Interfaces Counters, Recorders

SAN ANTONIO, Texas — The Datos 305 is a programmable digital instrument interface designed for users of DVMs, counters, transient recorders, correlation analyzers, digital temperature and pH meters and other similar instruments.

The 305 accepts the parallel data (either BCD or binary) from the instrument, serializes it, formats it, decodes it and sends the data to a teletype-writer, programmable calculator, paper tape punch, modem or computer.

Data can be formatted in any sequence and in any code desired, according to the firm.

Price is \$1,150 with 30 day delivery quotes from the company located at 8402 Speedway Drive, 78230.

## Unit Fights Brownouts

SANTA MONICA, Calif. — The provision of 1,800 W of regulated power in an 80-lb package is available from Pioneer Magnetics, Inc. in its \$2,100 PM 2462 power supply. The standard unit has four output channels available: 5V at 200A; -2V at 200A; and 12V at 15A. Overload and short circuit protection is built in and extended output hold-ups in excess of 20 msec are provided to protect against utility power dropouts.

The unit is designed to meet UL-478 and the RFI requirements of VDE 08.75.

Optional features including overvoltage protection, DTL- and TTL-compatible interface signals, over temperature cutout and output power sequencing are available.

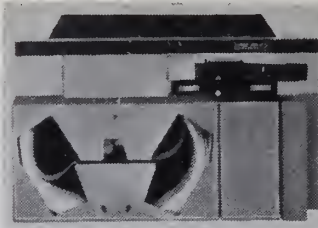
Pioneer Magnetics is at 1745 Berkeley St., 90404.

## 7470 Perforates At 70 Char./Sec

SANTA CLARA, Calif. — The 7470 paper tape reader/punch perforates mylar or paper tape at 70 char./sec and reads synchronously at 400 char./sec and asynchronously to 300 char./sec.

The unit has a 1,000-ft capacity supply bin for the punch; a 140-ft capacity take-up for punched tape; and a 140-ft fan-fold bidirectional bin for the reader.

A special alloy steel in the punch head provides a life expectancy of 200M characters with paper tape and 60M with mylar, according to lomec.



lomec 7470 Reader/Punch

The punch accepts 5- to 8-level tape without adjustment.

Both punch and reader can be controlled remotely or by front panel switches. The 7470 comes complete with power supply and all electronics for \$2,090. Interfaces are available for most mini-computers including the DEC PDP-8/e, PDP-11 and Data General Nova series. lomec is at 3300 Scott Blvd., 95050.

## Initializer Formats Diskettes to IBM Specs

SUNNYVALE, Calif. — Shugart Associates has developed the SA3905 Diskette Initializer which is capable of initialization of 80 unsealed diskettes per hour. The initializer incorporates a precision diskette drive, drive control electronics designed to format diskettes for conformance to IBM compatibility specifications for prerecorded index and data addressing.

The drive, electronics and power supply are rack mounted in a 48 inch by 22 inch by 29 inch cabinet and cost \$32,000.

Delivery of the SA3905 Diskette Initializer is 15 weeks. Shugart is at 335 Soquel Way, 94086.

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## Male Rules Book World

NEW YORK — Children's schoolbooks are sexist, according to a computer analysis of five million words encountered by American children in their schoolbooks. The study's results are discussed in the December 1973 issue of *Ms. Magazine*.

The study revealed that in schoolbooks — whether the subject is reading, math, social studies, art or science — males command center stage. Even in home economics, the pronoun "he" predominates by nearly two to one.

Other findings included that in school books:

- There are nearly seven times as many men as women and over twice as many boys as girls.
- The ratio of "he" to "she," and "him" to "her" is almost four to one.
- Four times as many sons and daughters are referred to only as the children of a male parent.
- Uncles appear twice as frequently as do aunts.
- Of those aunts four times as many have nephews as have nieces.
- Sons outnumber daughters by more than two to one.
- Every single first born child is a son.

## Kidney-Transplant Match in 4 Minutes!

BRISTOL, England — The complexity of matching donors and recipients for kidney transplants and the importance of finding them quickly make the computer a necessity for a life-saving service operated by the Western Regional Hospital for the National Tissue Typing reference laboratory here.

The National Organ Matching and Distribution Service centralizes tissue-typing information on all patients awaiting kidney transplants at the participating centers and compares it with data on the donor. The better the match the less likelihood of rejection of the new organ.

There is a severe shortage of donor kidneys, and the time between known availability and the transplant operation can be no more than 16 hours; ideally it is less than 10. Therefore the service operates 24 hours a day, 365 days a year, with an on-call duty officer, computer operator and tissue-typing serologist.

The key to the matching process lies in identifying antigens which, if present in the transplant and not in the host, would provoke the formation of antibodies in the host's blood, causing rejection of the kidney.

These antigens are identified by blood sera known to contain

specific antibodies. More than 100 blood sera are used nationally for reference purposes and the work of identifying them requires extensive computer support, since it involves large matrix comparisons. The South Western Regional Hospital Board's computer center provides this support on a bureau basis, as well as running the matching programs immediately when a donor kidney becomes available.

On the average, matchings take place once or twice a day but as many as eight have been undertaken in a 24-hour period. From the time the telephone rings in the computer center announcing an available donor to the time the duty operator calls the National Tissue Typing laboratory with the results of the computer run only 10 to 15 minutes elapse, with the record standing at four minutes.

The information provided by the Honeywell 2060 computer lists the 10 best matches near the donor center, then nationally within the UK and finally on a European basis when necessary. It notes the quality of the match, the degree of urgency of need on the part of the waiting patient, the blood group and particular antibodies that have been identified.

On the basis of this information the National Tissue Typing laboratory makes the choice of recipient and donor.

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## No Time to Snooze Just Bring Booze

PHILADELPHIA — Unpredictable and short-notice orders are problems that William H. Pflaumer & Sons Inc., a beer distributor, is solving with the help of a computer.

"We receive more than 2,000 telephone orders weekly," said Fred Nichols, president, "many of them demanding next day delivery. The computer has proved invaluable."

Because state laws require each shipment of beer to be paid for on delivery, invoices have to be ready at each stop. The System/3 Model 10 helps solve this problem by preparing the invoices from customer data stored in the system, and has them ready for the drivers early in the morning every day.

### Inventory Control

The computer also aids inventory control through requirements forecasting. "Data from all our marketing zones, including the sales performance of each brand, package and customer within individual zones, is stored in the system and available for immediate update and use," Nichols said.

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## Computer Science Conference Offers Employment Register, Workshop

DETROIT — A computer science employment register will be held during the Detroit Computer Science Conference, offering employers and prospective employees an opportunity to get together.

The conference, Feb. 12-14, at the Detroit Hilton, is sponsored by the Association for Computing Machinery, IEEE, National Science Foundation and the American Society for Engineering Education.

Invited papers will be presented in the areas of computing research on complexity theory, programming languages, artificial intelligence and computer graphics.

A terminal workshop on the construction of an inexpensive TV-type computer terminal is also scheduled.

The deadline for employment register forms is Feb. 1. Both

prospective employers and employees must file official registration forms.

The service is free to students, \$5 for non-students and \$15 per employer form submitted.

Forms and further information on the employment register can be obtained from Orrin E.

### Societies/ User Groups

Taulbee, Department of Computer Science, University of Pittsburgh, Pittsburgh, Pa. 15260.

Registration for the Computer Science Conference is \$5 for students, \$20 for all others. Information on the conference is available from Seymour J. Wolfson, Computer Science Section, Wayne State University, Detroit, 48202.

## Society Sundries

C.W. Spangle, executive vice-president of Honeywell, Inc. and operating head of Honeywell Information Systems, Inc. will be the speaker at the conference luncheon of the 1974 National Computer Conference, May 7.

John D. deButts, chairman of the board and chief executive officer of the American Telephone & Telegraph Co., will deliver an address at the NCC industry luncheon the following day.

\*\*\*

A new bi-monthly newsletter, *Compu-Fax for Executives*, covering significant developments and trends in the computer industry, is being published by the Data Processing Management Association (DPMA). The publication is available at no cost to executives who request it from DPMA, 505 Busse Highway, Park Ridge, Ill. 60068.

\*\*\*

Civil Engineering Program Applications (CEPA), an independent association of professionals, has received a grant for more than \$200,000 from the National Science Foundation for support of a study project. The project, entitled "Definition of a National Effort to Promote Effective Application of Computer Software in the Practice of Civil Engineering and Building Construction," will define ways of promoting more effective transfers of computer-based technology from research to practice.

\*\*\*

Raymond J. Wilcox, GAF Corp., has been elected president of the Association of Reproduction Materials Manufacturers for 1974.

\*\*\*

Jerome Hilger, M.D., was named president-elect of the Society for Computer Medicine.

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authorization and editing as a 'back-up system,'" says Robert C. LaHair, President of BancSystems Association.

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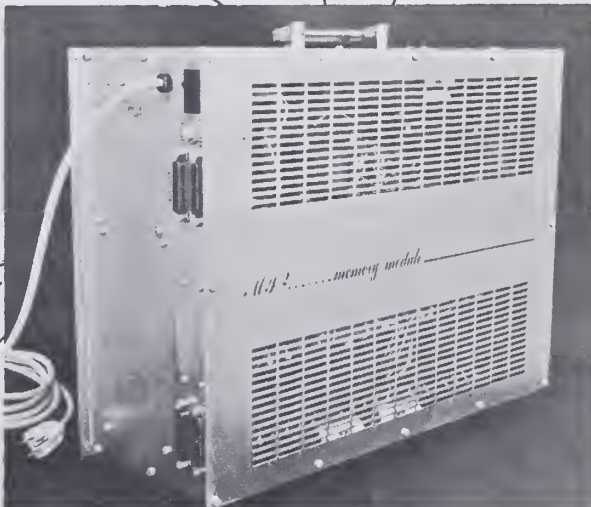
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## Hub's Plan to Make Sense for Trolleys

By Marguerite Zientara  
Of the CW Staff

BOSTON — Boston's Green Line trolleys will be the best bet for those citizens using public transportation in about a year and a half, if a new electronic system now being designed is successful.

The project will affect 3-1/2 miles of one of the city's major thoroughfares, Commonwealth Avenue, where electronic sensors will be buried in the ground between the tracks. The tiny sensors, to be encased in cylindrical-shaped plastic containers and linked by underground wires to the Boston City Hall computer — a General Automation 18/30 — promise to speed service on the busy line by giving priority to the streetcars over autos and trucks at 23 signalized intersections along the line. The sensors will send messages back to the computer as the trolleys approach a traffic light.

Unless the traffic is very heavy, the green phase of the light will be stretched a few seconds, allowing the trolley to pass

through the intersection. Conversely, a red signal phase would be shortened to allow the trolley to pass, according to Dan Reisner, the New England manager for Tippetts-Abbott-McCarthy-Stratton (Tams) of Brookline, designers of the system.

In addition, as part of the Green Line project, and also designed by Tams, transmitters will be installed on three trolleys to send information to the Massachusetts Bay Transportation Authority (MBTA) control center indicating which trolley is passing which point and when, Reisner said. The city hall computer will relay information to

the MBTA control center via a CRT and teletypewriter; the information will concern the monitored trolley cars as well as information on how well the signals are operating.

The purpose of the monitoring system is to determine whether the trolleys are making their schedules and, if not, to determine why. The system may be expanded to other cars if the MBTA decides it is worthwhile.

The total system is expected to be operational 18 months after the awarding of the installation contract, soon to be announced by the state Department of Public Works, according to Reisman.

## The Rest Is up to You

BUFFALO, N.Y. — You've probably known for a long time that you get tired after driving for a lengthy period of time. Now the U.S. Department of Transportation has come out with some facts on the subject that may make you rest more often on that long trip.

Tests were made in a Cornell Aeronautical Laboratory, Inc. simulator here with road conditions set up and controlled by a computer.

Results determined that on the average, after four hours of driving, a motorist takes 20% longer between corrections of the steering wheel. The automobile with a fatigued driver drifts more than twice as far from the center of the lane. If there is a blowout, before the driver gains control, the car will swerve three times as far as when he is fresh and alert.

The value of rest pauses gained some support from the tests. Each driver, after completing a four-hour stint, took a four-minute break, then returned to the simulator for a brief additional run. After the rest, drivers had accuracy equal to that at the end of their first hour of driving.

## Was It Sex That Killed Weevil?

HILLSBORO, Texas — The boll weevil may be a dying breed thanks to insect sex attractants and computers now used in an experimental three-year program aimed at producing better cotton pest management plans for the Blacklands.

Bill Buxkemper, Hill and Ellis Counties entomologist, is using computer programs to correlate insect damage in cotton with certain stages of plant growth.

"Out of a two-month growth, one week may be the most critical in terms of fleahopper damage," he said. "One insecticide application during the two months may be all that is necessary for a good crop."

The program, being conducted on more than 10,500 acres of cotton land in the two counties, also involves a survey method to estimate the boll weevil population in a farmer's cotton field. The process involves placing small wicks of pheromone or sex hormone to attract the weevil in cone-shaped traps.

The works and methods in the two counties are expected to be applied to the entire 25-county Blackland area once the program is completed.

## So You Women Want a Career?

FRANKFURT, West Germany — If American women are like German women, then half of you DPer out there should be complaining of insomnia, nervousness and marital problems. If you are an airline stewardess, then you top the list of those most likely to have stomach complaints, according to a nationwide survey of German female death statistics.

The net result of the survey was the conclusion that career women in West Germany die an average of six years earlier than housewives — at 68 as compared to 74. Working wives are most likely to experience premature or difficult births, according to the study.





# New Diagnosis Method Tracks Isotopes Through Body

BETHESDA, Md. — Scientists at the National Institutes of Health here are using a computer-controlled data analyzer to develop and evaluate new techniques in nuclear medicine.

Studies under way include the mapping of physiological function within particular organs and experiments in image-processing, to facilitate the interpretation of scintigraphic dis-

## The World Of Nuclear Medicine

plays.

Nuclear medicine requires the application of radioactive materials to the diagnosis and treatment of medical problems. In typical nuclear procedures, the course taken by a radioactive isotope as it passes through the body to a particular organ, the time it takes to arrive and the distribution within the organ may all contribute to the diagnosis of disease.

In one frequently used technique, for example, a trained observer can detect blockage of a ureter by watching how iodine 131 accumulates in the affected

kidney.

A Hewlett-Packard 5407 Scintigraphic Data Analyzer System is specifically designed to give the researcher or diagnostician flexibility in handling the data gathered by a scintillation camera.

The 5407's components include an analog-to-digital converter that digitizes the count rates recorded by the camera, a magnetic disk unit for storing the digital data, an HP Model 2100A minicomputer to process the data, an oscilloscope to show the graphic displays that the computer constructs from the

data and a keyboard for controlling the system.

Besides displays of scintillation images the system will also compute and show curves describing the change of isotope concentration with time. This is done by programs supplied with the system in response to simple commands issued from the keyboard. As with image displays, these plots can be generated for the entire organ under study or for a particular region chosen by the operator.

This isolation of specific regions is possible only with a computerized data analysis

system. It is also the key to functional mapping.

In mapping, the system not only computes and displays the isotope concentration at each point, but also maps some aspect or organ activity. It might, for example, show the time rate at which concentration is changing at each point.

Although the system doesn't include functional mapping programs in its standard software, researchers at NIH found it an easy task to add their own functional mapping programs to the system.

NIH scientists have also worked on mathematical techniques for improving the interpretability of brain scans, so that an observer may more readily detect abnormalities.

The system can also be used to do physiological calculations based on isotopic data. For example, one can compute cardiac output from observations of how human serum albumin labeled with technetium 99 passes through the heart. A program that will compute cardiac output from such data is easily added to the system's software.

In all of its functions, the system is controlled from an integrated keyboard; there is no special programming language required.

The HP 5407 has 12,288 words (16 bit) of core memory and a disk memory with an additional 2.5 M words of storage.

Both disk and magnetic-tape memories are used in handling scintillation data. Raw data is first stored on disk and then converted to frame data; that is, the system composes two-dimensional scintillation pictures from the raw data. This frame data, after processing, can be transferred to magnetic tape for storage as part of a patient's permanent record.

For disk storage, the 5407 uses a dual disk unit with one disk fixed and the other removable. Data capacity is 40M bits, with a data transfer rate of 2.5M bit/sec. Total average access time (position and rotation) is less than 48 msec.

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# Small Hospital Is Big Enough for In-House System

By J.L. Barnes

Special to Computerworld

RICHMOND, Calif. — As medical services increase in complexity, government agencies and accrediting authorities are asking for more detailed statistics on patients, diseases and medical staff performance.

Faced with this double workload, most hospital administrators acknowledge the advantages of upgrading their recordkeeping systems through data processing. However, the cost of computer hardware has, until recently, tended to discourage many smaller hospitals from adopting automated systems. And even those hospitals that have moved up from manual systems have tended to turn their data processing work over to a service bureau.

With the development of less expensive computing systems, however, even the smallest hospitals are finding that they can afford to handle their data processing in-house. And those that do install their own computers gain the enormous advantage

of being able to pattern their recordkeeping and information systems to their own unique needs.

That has been the experience of the Richmond Hospital Association. After handling recordkeeping and statistical work manually for 42 years, the 92-bed hospital recently installed an IBM System/3 Model 10 to handle a wide range of data processing jobs, including medical records, payroll, patient billing, accounts receivable and accounts payable. Other applications, including budgeting, inventory control and general ledger, are planned for the immediate future.

Although the system has been in operation for less than two years, it is already producing a number of solid benefits, particularly in the area of medical records where clerical effort has been reduced by more than 50%.

## Recordkeeping a Problem

In the new recordkeeping procedure, the computer begins to monitor patients from the time they are admitted. Admissions information is keypunched onto

cards to establish the patient and master files.

From this data the system generates a daily admissions report. The same information is used to print the heading information on preprinted medical records case abstract forms, which are held by the records department until the patient is discharged.

Upon discharge, the patient's chart is sent to the records room where it is checked for completeness. The information needed to build the hospital's statistical data base is then transferred from the chart to the abstract form.

Records personnel place check marks in designated boxes and enter a few codes to indicate final and associated diagnoses, primary and associated operations, and to identify physicians, surgeons and consultants on the case.

Once the abstract is completed, the information is keypunched onto cards that can be processed by the System/3 in a variety of ways to produce the statis-

tical reports needed by hospital administration, staff and the various committees.

## Case File

A key control document produced by the computer is a daily audit of the medical records case file. This lists all patients discharged that day by patient number and name. It also lists the various categories of data required to be entered on the abstract and, by printing asterisks in the applicable columns, indicates those portions of each abstract that are not yet complete. The audit also gives a breakdown of discharged patients according to type of service and the number of patient days in each service.

At the end of the month the computer produces an update audit covering all patients discharged during the month. The report shows the total number of patients, the number of re-admits, the number of deaths and the total patient days.

The hospital follows the practice of suspending from the staff any physician who does not complete all of his charts within 30 days after his patients are discharged. For this reason the medical records department notifies the attending physician in the event a chart is still incomplete after 15 days.

The computer-generated audits simplify this procedure, in that it is no longer necessary for a records technician to search through a manual suspense file each day to locate the incomplete charts.

A major problem faced by the medical records department in any hospital is the job of identifying and pulling those charts that require committee review. In the past, this was a time-consuming job at Richmond Hospital. Also, because the system depended entirely on a physical perusal of the medical records files, charts that should have been sent to committees were frequently overlooked because they happened to be out of the file at the time.

The System/3 has taken over the job of monitoring committee referrals, and this has not only helped reduce clerical effort in medical records, but also assures 100% referral to the proper committee of those charts that require analysis or action.

Three comprehensive indexes produced on a quarterly basis by the computer permit in-depth analyses of diseases, operations performed and the activity of individual physicians.

The three indexes provide a handy cross-reference of diseases, operations and physicians, and are of special importance to the peer committees. The physicians index is of particular value in appraising the overall performance of members of the medical staff, since it lists the activity of all physicians and surgeons on every case during the quarter. The index also summarizes, for each physician, the number of patients he had, their average hospital stay, the number of complications arising and the number of committee referrals, consultations, normal tissue findings, deaths and autopsies.

## Patient Billing

Another area where the computer has streamlined procedures and reduced manual effort is in the area of patient billing. As services are provided during a patient's stay in the hospital, the various ancillary departments forward a simple form to data processing indicating the patient's name and number and the type of service provided.

The computer runs this service data against a master card file that contains prices of all hospital services. It automatically applies the correct charge to the patient's file, and upon discharge of the patient automatically prints the bill, breaking down all charges according to the services provided.

J.L. Barnes is administrator, Richmond Hospital Association.

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## Releases Spaces

# Airline Singles Out Duplicate Bookings

NEW YORK — Don't bother making duplicate reservations on a United Airlines flight to ensure a seat, because its computer will probably find you out.

As part of United's Apollo system, based on an IBM 360/195, a program is run each day which checks bookings under similar or exact names,

flight numbers, dates and contact numbers, which the customer gives the airline in case of a change or cancellation on the part of the airline.

If everything on the CRT is identical, then it's very possibly a duplicate reservation, according to William Duggan, reservations manager. The airline will call the customer to confirm the facts before cancelling any duplicate reservation, Duggan said.

"If there truly is a problem where a person didn't know which flight he could make, we try to help by booking him on

one and listing him on another," according to Sally McElwreath, assistant to United's public relations manager here.

The system does not extend to other airlines, McElwreath said. United can check only reservations on United.

The reservation checking system has been in operation for almost two years, according to Duggan. "It's great," he said. "It's not 100% foolproof — we can always find errors in it — but it does release a lot of space for us to resell, which is in effect dollars."

## They'll Probably Disconnect It Like Seatbelts

NASHVILLE, Tenn. — Dr. T.C. Helvey, professor of cybernetics at the University of Tennessee, believes he has a surefire way to enforce the proper speed limits on the nation's highways:

You're driving along at 80 mph when a transparent red flashing sign appears on your windshield reading "slow down." Since there isn't a patrol car in sight, you keep going 80 until you realize all other traffic is making way for your car and there's another red flashing sign on the back windshield, telling everybody on the road you're a hazard.

You arrive home in record time only to find a computer has picked up your code number and a traffic ticket is awaiting you.

Helvey claims all this could be as commonplace as the traffic light in the next decade. He claims computers will set speed limits in the future for every car, every driver, on every highway at all times.

Helvey foresees every driver being given a small metal license tag bearing his name and the driver's speed rating he is licensed for. The tag will be dropped into a slot of a mini-computer mounted on the car, without which the car won't start.

If the car exceeds the driver's licensed speed limit, the warning lights will flash and the central computer at the police station will automatically receive a report of the violation.

Sensors embedded in the pavement will also feed speed limit information into the computer to be checked against the car's actual speed, Helvey said.

## Too Much Family Proves Too Confusing

WILLINGSBORO, N.J. — When three members of one family attend the same school and have the same initials, there is bound to be some confusion, even on the part of the computer.

Retired Army veteran Sandy Cheatham is a senior education major at Burlington College. His wife Mary is a freshman majoring in social work. Their son Sandy III and daughter, Sandra, are students in the college's liberal arts program.

With everyone but Mary having the same initials, "the VA computer kept messing up and rejecting our applications, and we wouldn't get our checks," Sandy Cheatham said.

The problem was solved when the Veterans Administration reprogrammed the computer to use different symbols for the three names.

## How to Shop for a College

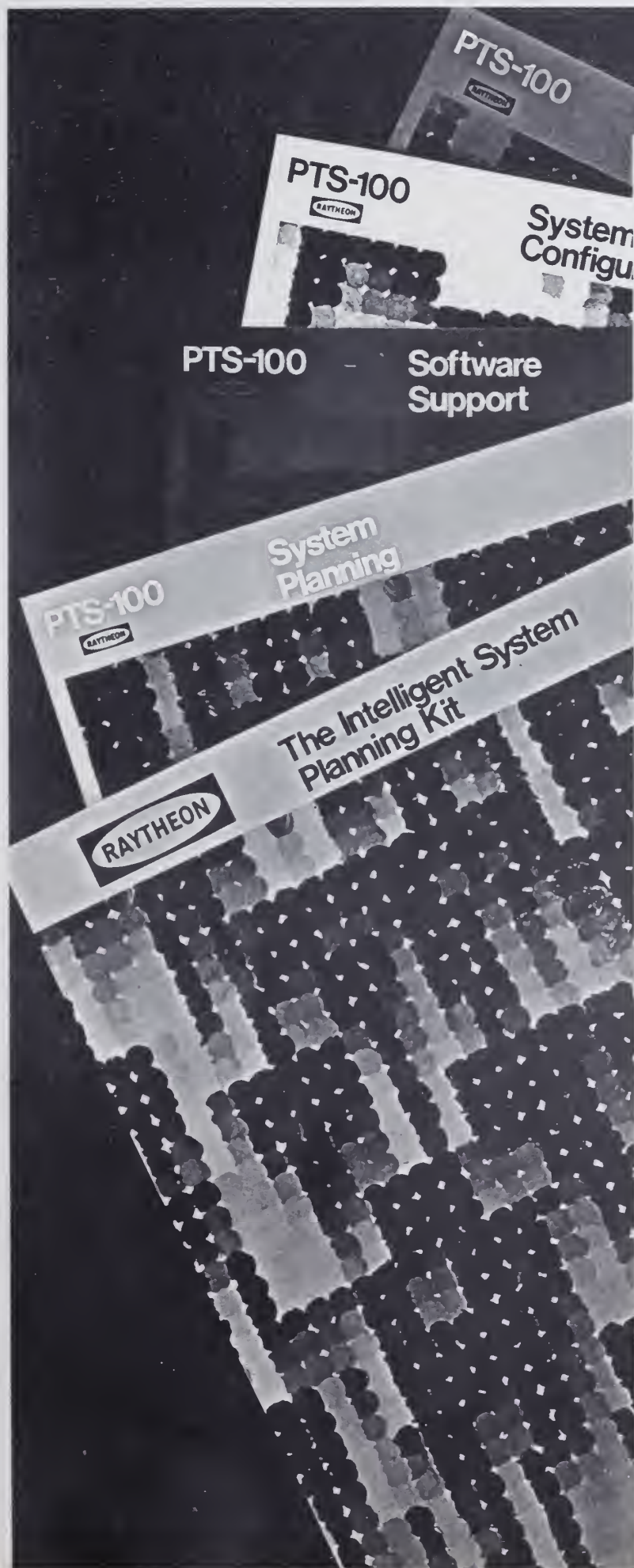
BRIGHTON, N.Y. — The high school student's jigsaw puzzle of prospective colleges is moving toward a solution with the help of a computer for students in Pittsford, Brighton, Brockport, Greece and Gates-Chili, N.Y.

Time Share Corp. of New Hampshire, originator of the system, houses the computer that feeds the high schools' terminals. The data base includes information about 771 characteristics of 1,600 four-year colleges and 1,000 two-year colleges.

Student and counselor punch in information about a student's preferences ranging from the size of the school to specific details — is there a ski program? — and from geographical information to whether coed dorms are available.

"It's a perfect inventory system," said Arthur Chapin of the Brighton High School guidance department. "It reduces the shopping problem." However, he also cautions that the machine "is not a miracle — it can't match perfectly. What it can do is sort out information to fit an individual."

Chapin said Brighton uses the computer for 20 hours in the spring and 30 hours in the fall.



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3. OPTICAL SCANNING
4. OFF-LINE KEY ENTRY

### THIRD DAY—Operations Management/74 Workshops On:

1. PERFORMANCE MEASUREMENT
2. PROJECT CONTROL
3. MULTI-VENDOR INSTALLATIONS
4. SMALL CENTERS

### SECOND DAY—Data Communications Update Workshops On:

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2. FRONT-END PROCESSORS
3. ON-LINE SYSTEMS
4. EQUIPMENT SELECTION

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9:30 - 10:15 Panel Discussion  
10:30 - 11:45 Concurrent Workshops  
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## CI Notes

### Data 100 to Provide Terminals for California

MINNEAPOLIS, Minn. — Data 100 Corp. has signed a two-year lease contract with the State of California to provide the Business and Transportation Agency with 25 computer terminals having a total retail sales value in excess of \$1.3 million.

The equipment will be installed in the network served by the Stephen P. Teale consolidated data center.

The transaction will result in rental income of \$700,000 during the two-year period, and the terms may be extended another year. The bulk of deliveries of Models 71 and 78 will be completed by February, the firm said.

### Pertec Delays Printer Production

EL SEGUNDO, Calif. — Pertec Corp. has temporarily delayed scheduled production of its P7330 medium-speed line printer being developed by its Peripheral Equipment Division, pending additional design review.

"The decision for postponement was made to allow time for further design review," President Ryal R. Roppa said. "We feel the reliability of the product at this time does not come up to Pertec standards."

Production volume shipments, previously scheduled for this month, will be delayed.

Poppa emphasized the company has not changed its commitment to establish a line of quality medium-speed printer products.

### Bache & Co. Signs With GTE

NEW YORK — Bache & Co., Inc., a brokerage firm, signed a \$12-million, seven-year contract with GTE Information Systems, Inc. for a high-speed global data communications system to handle worldwide securities and commodities traffic.

The agreement will provide for the expansion of the existing Bache Automated Communications and Order Match System (Bacom) with a "customized" network covering 131 Bache offices and 52 stock and commodity exchanges in 11 countries.

The system will utilize about 1,100 GTE Information Systems Videomaster brokerage terminals and 100 IS/7800 video terminals and more than 225 hard-copy remote printers.

In the future, the system will be able to provide the 2,000 Bache registered representatives with up-to-date information on the status of any customer account.

### NCR Adds Marketing Posts

DAYTON, Ohio — Two new positions have been created in NCR's Domestic Marketing Division as part of the division's current reorganization, oriented toward the major lines of business served by the company rather than along product lines.

The posts will serve as "strong connecting links between marketing and other corporate groups," said E.F. Shipman, vice-president, marketing.

D.J. Muckerheide has been named director, Marketing Product Programs. He will provide liaison between the Marketing Division and various NCR product development groups, as well as oversee the division's product inventory levels and delivery coordination.

W.E. Bird, as director of Marketing Software Programs, will be responsible for broad software policies and procedures, and have jurisdiction over customer support centers and the distribution of basic software as well as coordination of applications programming.

## Possible Recession Strategy

# Mainframers Eye Eastern Bloc Market

By E. Drake Lundell, Jr.  
CW Washington Bureau

WASHINGTON, D.C. — With the prospect of a recession growing daily for the domestic U.S. scene, many computer manufacturers, and particularly IBM, may be looking for sharply increased international sales — especially to Eastern Bloc nations — during 1974 in order to keep profits and revenues on a steady upward course.

Although most government economists here are trying to keep a fairly optimistic front for the coming year, unofficial estimates — and some prestigious econometric models — are predicting a "hard" landing for the U.S. economy during the year with unemployment rates reaching up to 8% during the spring.

And the computer industry learned during the economic slowdown of 1969 and 1970 that it was no longer "recession proof" as had appeared earlier in the 1960s, with domestic shipments dropping rapidly for the period for most manufacturers and particularly for IBM.

In fact, during that time IBM sales fell to as low as 50% of quota in the U.S., according to some industry estimates, even though the firm does not release such figures.

But IBM — and many other computer makers — were still able to report growing profits and revenues quarter by quarter even while U.S. profits were slipping by an increasing reliance on their international operations.

However, there is a new factor in the equation for this coming year that was not present during the earlier recession: It appears that both the European and Japanese economies are headed for a slowdown that will approximately match that of the U.S. in timing, due to the Arab oil embargo.

That leaves the Eastern Bloc countries as one of the remaining areas for possible expansion.

IBM may well have seen the handwriting on the wall long before the effects of the present crisis were known since it applied early last year for accreditation to the USSR, which would allow it to open offices in Russia and to employ Soviet nationals.

The only Western company currently

accredited to the Soviet Union with an office in Moscow is International Computers Ltd. of Great Britain, but recently Control Data Corp. of the U.S. signed a \$500 million trade and technology pact with the Soviets — clearly indicating an intention on the part of that firm to increase its sales to the Eastern Bloc nations.

Therefore, IBM's move takes on increasing significance, even though the firm will not officially comment on its plans for the Soviet Union or other Eastern Bloc countries.

The U.S. and Japan have very high computer utilization rates compared with their population bases and the Western European nations are not far behind, but the Eastern Bloc countries have relatively low computer utilization rates based on the same measure.

Therefore it would seem logical for firms to try to significantly increase their exports to Eastern Europe while trying to hold their own in the U.S., Western Europe and Japan if the expected economic slowdowns occur.

But the big question still to be an-

swered in this equation is the loosening of export controls on computer equipment to the countries in the Soviet sphere, a question that is currently being studied by a blue ribbon panel here.

So far there are conflicting reports from the group, but most informed sources indicate it is likely to recommend a relaxing of the previously stringent controls. The expected slowdown in U.S. computer exports that could come with a slowing of the Japanese and Western European economies could give a boost to this relaxation policy since computer equipment is a major contributor to the currently favorable U.S. balance of payments.

### Sales Strategies

In addition to a possible move to the East in international marketing efforts, IBM's overseas sales policies can be expected to pretty well match the U.S. policy — upgrade present System 360 users to the newer 370 equipment while catching more smaller and first-time users with the System/3.

(Continued on Page 42)

## Minicomputers Outpace the Pack In Growing Canadian Installations

OTTAWA, Ont. — Strong growth in the minicomputer section led the Canadian computer population in a 30% growth to 5,736 units during the year ended May 1, 1973. This compares with a 24% growth rate in 1972 when there were 4,406 computers installed, according to the computer census prepared by the Canadian Information Processing Society.

Although still the leader in the number of installations, 1,458, IBM's share of the market fell to 25.4% compared with 32.5% or 1,423 last year.

Burroughs climbed to second place with 1,042 installations or 18.2%, displacing Digital Equipment, which dropped to third, with 986 installations or 17.2%.

Minicomputers accounted for 1,135 of the 1,330 new computer installations during the year. There were 976 units installed that rent for under \$1,000/mo and 159 units that rent for under \$2,000/mo, noted society President Grant Boyd.

"It is interesting to note that there was also a sharp increase in the number of large-scale systems renting for \$50,000 a month and over," said Boyd, "a field in which we found 29 additional installations." This represents an increase of 25% to a total of 144 machines.

The dramatic growth in Canadian computer use is demonstrated in the society's figures over the past five years.

"The 1968 census showed 1,613 installations, compared with this year's 5,736 installations, for an increase of 356%," he said.

Manufacturing dominates the share of computer installations by industry, with 1,407 installations or 24.5% of the total. Government has 698 or 12.2%.

Splitting up the revenue pie, IBM still leads with 57.4%, but this is down from 63% in the year before. However, IBM figures are said to be usually incomplete because the firm does not publish information on its customers' installations.

Number two in terms of revenues is Honeywell with 9.6%, followed by Univac with 9.5%.

Burroughs has 5%, Digital Equipment and Control Data each have 3.9% and all others share 11.2% of the total revenues, according to the report.

More than 70% of the computers are operating in Ontario or Quebec Provinces.

Ontario has 2,809 installations, accounting for 49% of the total. Quebec has 1,271 installations or about 22% of the total. The Provinces of Alberta and British Columbia have 8.7%.

There is one computer in the Northwest Territories, two in the Yukon and 10 in the Province of Prince Edward Island.

## Who Will Succeed Watson?

ARMONK, N.Y. — The retirement of Thomas J. Watson Jr. at the end of this month raises the question of who will succeed him in IBM's ruling "corporate office."

Besides Watson, the other two members of IBM's ruling triumvirate are Frank T. Cary, chairman and chief executive officer, and Gilbert E. Jones, a senior vice-president and chairman of World Trade Corp.

Presently Cary holds all of the titles in the firm. In addition to the two mentioned above he is also the chief operating officer and president, but it is likely he will now lose those two titles as his job is split.

But that leaves the question of who will move up into those jobs while Cary remains chairman and chief executive. Jones is a prime contender, but certainly

not the only one.

Two names that are often bandied about by the hordes of "IBM watchers" in the industry and on Wall Street are those of John R. Opel who is 48 and George B. Bietzel, 45. Both men are presently senior vice-presidents and directors of the company.

There is also a possibility that an outsider could move into the company from one of the 117 operating companies that are part of IBM worldwide, particularly since the international part of the corporation has been the fastest growing of late and probably holds the key to successful future growth rates.

However, IBM would not comment on possible executive changes and realignments that might be in the works after Watson's retirement.



## General Automation's LSI-12/16

# Where Does Microcomputer Fit into DP Hierarchy?

ANAHEIM, Calif. — Where does a microcomputer fit in between the minicomputer and the microprocessor?

The microcomputer, as defined by General Automation, Inc. in its recently announced LSI-12/16 [CW, Dec. 19], uses a single-board processor and memory as the basis for a system that offers the benefits of the minicomputer world, according to Michael A. Ford, vice-president of Standard Products & Systems.

The GA microcomputer fits in the volume range of between 500 units/year and 5,000 to 10,000 units/year. It offers a single chip processor, low price and the "tuned" solution nature of the microprocessor with applications support, performance power and systems features of a minicomputer, he added.

Competition to the unit will come from two directions, he said, both the minicomputer world, with products such as Computer Automation's Naked Mini/LSI and the semiconductor world such as National's IMP-16.

### Lower Price

The GA microcomputer is lower in price than the minicomputer entry and has greater customizing capability and applications support than the semiconductor entry, Ford said.

These features make the LSI-12/16 "ideally suited for large volume end users for applications in numerical control, electrical and electronics assembly and production, process control and small communications systems, among others," he said.

"For OEMs, the unit is well-suited for the single 'board-only' applications, where configurations with 1K to 4K or

random-access memory (RAM) and 2K to 8K read-only memory (ROM) will solve problems at startlingly low prices," he said.

The microprocessor field, by contrast, has two segments, the single-chip processor and the multiple chip or chip set processors.

The single chip business is actually a components business. Products provide simple microprocessor logic for use in very large volume commercial applications such as appliances, simple terminals and point-of-sale devices, he said.

Volumes are very high per sale, typically 50,000 to 500,000 units/year per customer.

### Chip Set Segment

The chip set segment of the microprocessor world is comparable to the standard systems end of the minicomputer world. The units typically use chip sets driven by a standard control ROM (Crom), and are more expensive than the single-chip processors, Ford noted.

If the volume is high enough, customized Crom can be designed, but only in volumes over 5,000 to 10,000 is the cost justified.

These multiple chip processors are limited by competitive pricing at the high-volume, low performance end of the volume spectrum.

At the opposite end of the spectrum is the minicomputer market. Within the minicomputer market there are three basic types of business. The "bare bones" iron business, the standard OEM market for minicomputer boxes, has normal sales quantities ranging from 50 to 500 units/year per customer.

The market area adjacent to this iron business is the tuned solution area, in which minicomputers are used as customized solutions to match high volume applications. The sales volume in this segment usually runs from 50 to 500 units/year per order also, he added.

The third area of the traditional mini-

computer market is the standard systems business. This segment is typified by the large scale processors with peripherals. Because of the large applications needs and resulting larger system costs, typical volume at this end of the minicomputer market is from 1 to 50 units/year per customer.

## OECD Urges European Governments To Form Centralized DP Policies

By E. Drake Lundell Jr.

Of the CW Staff

PARIS — European governments have been urged to invest most computer utilization planning in a central national organization by a recent report from the Organization for Economic Cooperation and Development (OECD) here.

The report, "Toward Central Government Computer Policies," not only carries that recommendation, but also an analysis of the present policies of most of the European countries and the trends in evidence written by OECD consultant G. Russel Pipes.

"Public policy formulation for computers implies, above all, provision for proper institutional structure, planning capabilities and scope of direction or guidance among ADP users," the report noted. "If anything," it continued, "fragmentation of important features affecting ADP development has been the chief deterrent to developing coherent plans in most countries."

To overcome this perceived weakness, the report noted that "while the structure of central government direction or guidance of ADP policy within government may have two or three functional parts, a single department should have overall responsibility for coordination and house most central planning staff."

"Official recognition of a central office for computer policy development is important for the establishment of a stable framework within the administration," the report added.

The report also urged each government to resolve, as quickly as possible, the "uncertainties" that abound with regard to the confidentiality and security of personal data and that "special attention should be given to the question of the individual's access to public and private files containing personal information on him."

Along this line, the group also noted that "central governments are faced with the problem of engineering public aliena-

tion over the personal and societal implications of the computer," not only in the privacy area but also in other areas.

To head this off, the OECD group said formal programs "should be considered to apprise the public of the characteristics of computers, their use by government and immediate and future benefits," in addition to recommending that private data banks be placed under "special regulations."

### International Data

Taking note of the growing amount of international data transmission, the group said, "Governments will have to take steps to accelerate the harmonization of communications standards."

In addition, the group said, "There is a need for research into international data systems so that appropriate directives can be published and complied with. Some of this research should be internationally sponsored."

In regard to the central directorate for computer planning in each country, the group noted, "A certain degree of central financial control over software and hardware expenditures would greatly assist the development of central government policies."

"Pre- and post-installation evaluations are necessary to ensure economy of operation, compatibility with other ADP user operations and to plan time schedules for integration of systems," the organization added. "The planning function, employing techniques of three-year, five-year, or perhaps longer projections is important."

"The short-range, specific requirements plan can be merged with budgetary considerations to facilitate stable, prudent long-range expansion. Planning should focus on both ADP needs and uses and objectives of data handling to be reached in the future," the report stated.

## Protests Continue Over Teale

CW West Coast Bureau

SACRAMENTO, Calif. — The turbulence surrounding the contract for the Stephen P. Teale Consolidated Data Center is continuing with one firm protesting the award to IBM and another asking an investigation of possible antitrust violations.

Sanders Data Systems has submitted a letter to the state protesting the IBM contract for \$19.9 million for two 370 Model 165s and peripherals.

Fulton M. Smith, state EDP officer, said a reply will be made to Sanders and if needed, an opportunity for a hearing will be given.

Smith said a letter was also received from Control Data Corp. in which it said it was disturbed with the award.

CDC said it felt the state did not enter

sufficiently into negotiations and believed the IBM bid was structured in such a way as to prevent the state from having meaningful negotiations with CDC.

A CDC spokesman said a letter had also been sent to the state attorney general's office asking it to review the situation to see whether there has been any violation of state or federal antitrust regulations.

Smith said CDC will be given a hearing if it wants but said CDC did not offer a department of motor vehicles solution as part of its bid and refused to believe its peripherals weren't the least expensive.

"When we compared (IBM) prices with other contenders, there was no advantage to the state. We asked for the best price and felt IBM submitted the best price," Smith emphasized.

## Orders & Installations

Cleveland Trust Co. plans to lease a Trace Item Processing System from Recognition Equipment.

Bendix Research Laboratories has ordered a Systems 86 computer from Systems Engineering Laboratories, Inc. to be used in a hybrid computer system.

The University of Alabama, Tuscaloosa, has ordered a Univac 1110 computer for administrative, business and academic applications.

Litton Educational Publishing, Inc. has ordered a Univac 90/70 system to speed up its textbook production and distribution service.

Palmer G. Lewis Co., Inc. has ordered a Model 2020 system from Honeywell for use in financial applications.

The University of Washington has installed a B6700 computer from Burroughs for its medical, instructional and administrative data processing needs.

Virginia Commonwealth University has ordered a computer-based Student Information and Revenue Accounting System from Systems & Computer Technology Corp.

Lowell Supply Co. has ordered an NCR 725, NCR 280 electronic retail terminals, and NCR 785 data wands for implementation of a computerized inventory and sales recording system.

Continental Airlines has ordered PTS-100 programmable terminal systems from Raytheon Data Systems for reservations, ticket printing and passenger check-in.

Concel, Inc. has ordered a Measurex 1000/Model 75 computer control system for a tissue-making machine.

Ramada Inns, Inc. has purchased dual Decsystem-10s from Digital Equipment Corp. to manage its nationwide reservation service and handle major accounting and payroll tasks.

Firestone Tire and Rubber Co. has ordered a Measurex 1080 computer-integrated control system for the company's wire fabric calendar.

Northern Computer Products has ordered a CI-2 minicomputer business system from Computer Interactions, Inc. for general business applications.

Stone & Webster Management Consultants, Inc. has installed a Decsystem-10 from Digital Equipment Corp. for long-range financial forecasting, fuel dispatching, rate case work and load forecasting.

The clinical laboratories of the Yale-New Haven Hospital have installed a multiterminal, multiprogramming Hewlett-Packard 3000 computer to upgrade their computerized laboratory services.

Fernandes Super Markets, Inc. has installed a Super/Spice electronic point-of-sale system from Pitney Bowes-Alpex, in its Attleboro, Mass., store.

## Mainframers Focus On Eastern Bloc

(Continued from Page 41)

From internal IBM documents it is clear that the System/3 has a large role to play in the firm's overall marketing strategy as a means of getting smaller users on board and the same documents indicate a new model of the System/3 line may be coming this year.

The internal IBM documents, released as part of the antitrust suit with Telex Corp. this past year, also indicate IBM has a "true" minicomputer on the drawing boards that may well be released to the public during 1974.

These developments could mean IBM will be expecting a great deal of its growth during the coming year to come from the smaller end of the computer line.

With the larger businesses already fairly well saturated with computer power — especially during the expected tight economic times — the move to new users in smaller businesses may be the big growth area for 1974 — and based on the previous phenomenal success of the System/3, the strategy may well pay off handsomely on the profit line.



## \$200M Market Predicted for 1974

# 370 Availability to Boost Used Market

By Molly Upton  
Of the CW Staff

CHICAGO — The used computer market should rise about 80% in 1974 to about \$200 million, according to Charles Barry, vice-president of Comdisco, Inc.

Barry based his projections on the increased availability of 370 machines being traded, and noted these high-ticket items would certainly increase the value of the market. The volume of units traded will also rise, he said.

And the market could grow even more, if the government increases the use of competitive bidding to obtain such machines as 360/65s currently being bought directly from IBM, he said.

### Leased Not Used

Comdisco President Ken Pontikes drew the distinction between the leasing companies and the used computer dealers.

"Our basic business is to buy and sell equipment. Leasing companies are basically trying to recover the revenues which they invested a number of years back in the form of leases.

"We make an aftermarket for people

who bought machines from IBM," he said.

Although IBM does not make 360s in this country many users do not seem to recognize that if they buy from IBM they are getting a used piece of equipment.

IBM maintenance is offered on units obtained from either IBM or a used computer dealer, he noted.

One of the reasons Comdisco has not ventured into buying and selling used machines of other mainframe makers, he said, is the uncertainty that the other companies will offer maintenance on machines they themselves have not placed in service, Barry said.

Comdisco machines are refurbished either at IBM or an independent facility, he noted.

Comdisco has moved over 30 IBM 360/65s in the last year or year-and-a-half, he said, pointing out the savings of buying from a used computer dealer com-

pared with either buying used from IBM or renting from IBM. "A user can write off a 65 in about 42 months, and a 30 in about 30 months."

The principal source of machines for the used computer market is the purchased unit. The 360/20 is in demand, he said, as not many users initially purchased their 20s. They were generally small companies which chose to lease, he said.

"The Sub Model 5 is almost impossible to find," Barry noted, adding "the 20 is a real workhorse."

The supply of 30s and 40s is pretty good, he said, as many banks purchased dual systems, and the user who was looking for a machine that size was more apt to buy than the 20 user, he noted.

In fact, the 360 line is proving so popular that Comdisco has sold about five 360s — a 50, three 40s and a 30 — as replacements for 370/145s and 135s in the past year, Barry said.

## Wema Protests Oil Priorities

PALO ALTO, Calif. — The Western Electronics Manufacturers Association (Wema) has called for a halt to the preemption of the state's domestic oil supplies for military purposes while reserves set aside for defense remain unused.

In a letter to Sen. John Stennis, chairman of the Armed Services Committee, the association noted that the 575 Wema member companies in California employ over 400,000 people, most of them in areas which are faced with cutbacks in energy which could lead to massive layoffs and major cutbacks in production.

Most of these firms are located in the Bay Area and Southern California, two areas which have been alerted to the possibility of rolling blackouts as an energy-saving practice.

### Executive Corner

■ Paul Hachigian, a senior vice-president of Cordura Corp., has been named president and chief executive officer of Cordura's Troy Computer Products Corp., manufacturer of printing drums, Micr printing systems and retail coding equipment.

■ William J. Schmitt has been elected president and chief operating officer of Ticketron, Inc. He was formerly a vice-president of the National Broadcasting Co.

■ Richard H. Lussier has been named president of Intel Corp.'s Data Products Group. He will be responsible for all financial, marketing, technical support and customer service activities of the group.

■ Harold N. Morris has been named president of Datacraft Corp., manufacturer of computers and memories.

■ George G. Boyden, former marketing manager, has been appointed president of Clary Datacomp Systems, Inc.

■ Robert W. Kleinert has been elected a vice-president of the Service Bureau Corp., a subsidiary of Control Data Corp. Kleinert was most recently director of new business development at SBC.

■ Charles S. Cadwell has been appointed vice-president, finance and administration, for GTE Information Systems, Inc.

■ Joseph Freitag Jr. has been named vice-president, operations, for GTE Information Systems International, a subsidiary of GTE Information Systems.

■ DuWayne Peterson has been appointed staff vice-president, computer systems planning, for RCA Corp.

■ Robert T. Vaughan has been appointed staff vice-president, manufacturing, for RCA.

■ Charles H. Higgins has been named to the newly created post of vice-president, business development, at Bunker Ramo Corp.'s Information Products Division. He was most recently director of marketing for financial information systems.

■ Nunzio R. Perrotti has been named vice-president, finance, of Diablo Systems, Inc. He joined the company last March as director of finance.

■ Curtis L. Collison Jr. has been named vice-president, administration, a new position at Cambridge Memories, Inc. He joined Cambridge in May as director of administration after eight years with Honeywell Information Systems, Inc.

■ Frank E. Heart has been elected a vice-president of Bolt Beranek and Newman, Inc.

# supplementary, my dear advertiser.



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## General-Purpose Computers Seen Capturing the Business Market

NEW YORK — General-purpose computers eventually will capture the largest share of the entire business computer market, observed Daniel Alroy, president of Q1 Corp.

"Until now manufacturers of computers have contented themselves with designing, building and marketing general-purpose computers, but then almost invariably sold them as parts of limited-purpose systems," he observed.

There were three major reasons given in the past for not going to general-purpose systems, Alroy said:

- The industry previously found it less expensive to tailor a solution to a specific problem.
- The user tended to view his own need as a specific one, and therefore market research tended to point to specific solutions.
- In areas of specific technology, the technology experts have normally been right, but in the broader systems field, where technology is less significant than trade-offs in architecture, the solutions have proven more evasive.

But there are several reasons for moving into general-purpose systems where programming, not hardware, is used to meet specific applications. General-purpose systems:

- Have a larger potential market for the system.
- Will lead to greater standardization of system components, reducing inventories and maintenance costs.
- Mean a general-purpose language, eliminating the problem of operators trained to use several high-level languages within one system.
- Simplify user training.

• Are inherently non-obsolete in that the systems can be readily modified, without major hardware modifications, to meet further requirements.

The key to this computer revolution is the steady, rapid decline in the cost of performing data processing functions which result from technology advances and new trends in system architecture, he said.

In technology, for example, advances in Metal Oxide Semiconductor (MOS) work has led to cost reductions of as much as 50% in the manufacture of a memory element in only a few years.

The tremendous power, flexibility and resulting economy of the modern computer stems from the fact that it is a general-purpose machine. This is an architectural advantage, rather than a technological one, he said.

In addition to the computer, other elements of the system can be evaluated for multipurpose applications.

For example, PL/I is more suitable for general-purpose machines than Fortran and Cobol, which, in turn are more general than machine languages.

## Early Come, Early Go

SOUTHBORO, Mass. — Data General Corp. has adopted its random hours program as a permanent employment policy.

The program enables employees to start their workday any time between 6:30 and 8:30 a.m. and to leave work after completing an eight-hour work shift.

The random hours program proved to be an unquestionable success during its summer tryout, director of manufacturing Lawrence E. Donovan said.

Tardiness and labor turnover were reduced while morale was uplifted.

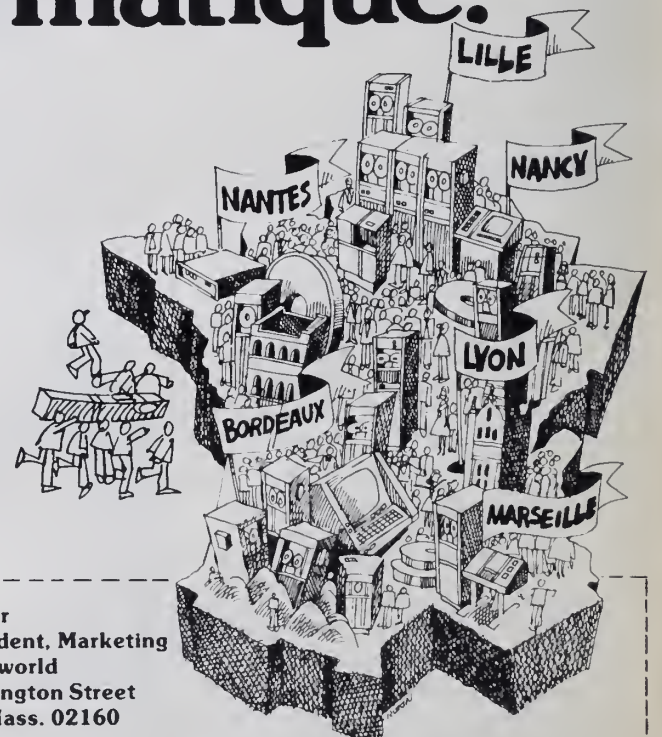
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## Burroughs Realigns Worldwide Groups

DETROIT — Burroughs Corp. has realigned its worldwide systems and equipment engineering and manufacturing activities into four operating groups, following a pattern set in the U.S. during the past several years.

"This plant specialization [by product line] has now been extended worldwide by placing responsibility for the development and manufacture of similar products within one of four groups," said Burroughs Chairman Ray W. Macdonald.

The four groups include the Computer System Group which is responsible for the engineering and manufacture of large-, medium- and small-scale computers together with related operating system software. This group has six engineering and

manufacturing centers in the U.S. and one in Belgium.

The Peripheral Products Group is responsible for engineering and producing all peripheral equipment. The group has two plants in the U.S. and two in Scotland.

Seven plants, located in the U.S., Belgium, Brazil, France and the United Kingdom, comprise the Small Systems Group, which is responsible for the engineering and manufacture of business minicomputers, terminal products and systems, and other small application machines, together with operating system software.

The Components Group has responsibility for electronic components used in the company's systems and equipment, includ-

ing integrated circuits, disk file heads and power supplies. Four plants, in the U.S., Brazil, Mexico and United Kingdom, service this group.

## New Zealand To Control Trains

Special to Computerworld  
WELLINGTON, New Zealand — Computerized control of railway cars is planned by the Woodville-Gisborne railway.

The system is regarded as a pilot scheme and may eventually extend to the whole rail network.

The focal point will be a terminal at the Napier railway station, which will be linked to a computer in the government computer center here.

The Napier-based scheme will involve a year of experimental work, according to T.M. Hayward, assistant general manager.

With a fleet of about 28,500 cars, worth \$110 million, the railway's goal is to optimize its car utilization.

Under the plan, stationmasters will gather information on each car in the Woodville to Gisborne section, and relay it to Napier, where it will be transmitted to Wellington for processing.

The sorted data would be printed out each morning and evening at Napier for the guidance of the control staff.

The printout will show the status and location of each car.

Hayward said the pilot scheme would be used to sort out operational procedures for any future expansion of the system.

He said the railway expects computerized control to be able to tell customers exactly where their goods are in the system, and when they will arrive for unloading.

## Dedicated Computer Population Rapid Growth Seen Continuing

NEWTON, Mass. — A census of dedicated application computers indicates the industry shows no signs of slowing down its four-fold growth rate since 1969, according to a recent issue of *EDP Industry Report* by International Data Corp.

The census covers minicomputers and certain larger systems usually designed for one application such as process control or

data acquisition. These systems tend to be word-oriented, are usually purchased, and are predominantly programmed in assembly language or Fortran, according to the newsletter.

The total installed U.S. base is expected to reach about 77,000 by the end of 1973, compared with its 50,000 base at the end of 1972.

On a worldwide basis, the number of units installed by the end of 1973 is expected to be almost 100,000, compared with about 65,000 at the end of 1972.

In 1974, *EDP/IR* projects there will be 114,000 installed units in the U.S. and about 150,000 worldwide.

The average value of units shipped will decline slightly, from \$20,000 in 1973 to \$18,000 by 1975, the report indicated.

## Expansions

Greyhound Computer Corp. has opened a service bureau in San Diego, Calif., utilizing the facilities of the former Aztec Computer Service at 724 12th St.

Cyphernetics Corp. has opened a European office in London.

Prime Computer, Inc. plans to move to a 60,000-sq-ft facility in the Framingham (Mass.) Industrial Park. The move will include all manufacturing and administrative operations.

Macrodata Corp. has opened a technical center at Yorktown Heights, N.Y.

Computer Machinery Corp. has leased a 266,000-sq-ft facility for future expansion and consolidation of its Los Angeles operations. The building is at 2560 Walnut Ave., Culver City, Calif.

Data 100 Corp. has opened a plant and office in Hemel Hempstead, England.

Iomec, Inc. has closed its engineering and manufacturing facility in Santa Ana and moved to new quarters at 3300 Scott Blvd., Santa Clara, Calif.

Pertec Corp. has expanded its Peripheral Equipment Division with the addition of a 37,000 sq-ft building in Chatsworth, Calif.

Terminal Data Corp. has purchased a building site in Warner Center Business Park, San Fernando Valley, and plans to construct a 74,000 sq-ft manufacturing and office facility there.

Digital Computer Controls, Inc. has opened a regional sales and service center at 10600 West Higgins Road, Suite 716, Rosemont, Ill.

## Contracts

Wangco, Inc. has received an OEM contract from Datapoint Corp. to supply Mod 812 tape drives, which will be used in conjunction with the Datapoint 2200 computer system.

Synoptic Systems Corp. has been awarded a contract from the Department of the Army for computer system support services.

Codex Corp. has received a contract from the International Satellite Organization (Intelsat) for the development of Automatic Repeat Request equipment.

Digital Equipment Corp. has received a \$2.4 million contract from Abbot Laboratories to build an integrated laboratory computer network including nine computers.

Systex, Inc. has been awarded a contract from Stromberg-Carlson Corp. for the production of a computer-based training system for telephone operators.

Ampex Corp. has received a contract from Ra-Nav Laboratories, to supply TMA model tape drives.

Leeds & Northrup has been awarded a contract by Central Maine Power Co. for an LN5400 computer control system.

Incoterm Corp. has been awarded a contract by Burlington Northern Railroad for the installation and maintenance of 68 Incoterm SPD 904 Remote Batch Terminal Systems which will interface with the railroad's Compass data system.

Fischer & Porter Co. has received a contract from the Philadelphia Electric Co. for digital computer and interactive graphic display systems.

Chilton Corp. has signed an automation service agreement with the Credit Bureaus of El Paso, Texas, and Saginaw, Mich. Chilton will automate the bureaus, train all personnel and provide data processing services.

Wyle Laboratories has received contracts valued in excess of \$8.5 million from the National Aeronautics and Space Administration for instrument support services and for research and engineering studies.

Digital Equipment Corp. has received a \$225,000 contract from Gallaudet College of Washington, D.C., the nation's only college for the deaf. The contract will increase the storage, communications lines and core memory of the school's Decsystem-10.

## Position Announcements

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3. 1400 Clean source to PL/1 trans-  
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Contact: W. Small, President



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13. General ledger totals
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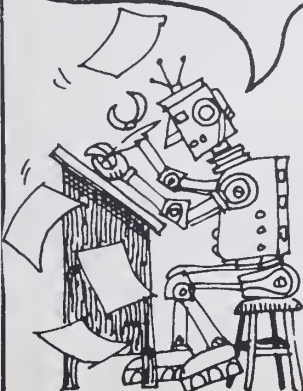
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- COST ALLOCATION
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PROFITABILITY REPORTING
- UNLIMITED NUMBER OF  
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OR INCREMENTAL COSTING
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USERS BY PRODUCT  
PAYROLL/PERSONNEL-215  
FIXED ASSETS-140  
ACCOUNTS PAYABLE-50  
INVENTORY CONTROL-25

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- ATLANTA, GA. 30318, 1778 Marietta Blvd., N.W., Phone: (404) 355-6110
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- JERSEY CITY, N.J. 07305, Liberty Industrial Park, 43 Edward J. Hart Rd., Phone: (201) 451-2222 (N.J.), (212) 267-1550 (N.Y.)
- SKOKIE, ILL. 60076, 7620 Gross Point Road, Phone: (312) 965-7550
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- MONTEBELLO, CALIF. 90640, 1501 Beach Street, Phone: (213) 685-3069

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# RCA

## MAI Reduces Fourth Quarter, Year Loss

NEW YORK — Management Assistance, Inc. has significantly reduced its fourth quarter and year losses.

The loss for the year dropped to \$1.7 million or 10 cents a share from \$11.2 million or 66 cents a share in the prior year. There were extraordinary credits in both years which totaled \$1.2 million or 7 cents a share in 1973, and \$1.4 million or 8 cents a share in 1972.

Revenues rose 28% to \$66.7 million from \$52.2 million in 1972.

The loss for 1973 was partially

attributed to lower than projected revenues and higher software costs relating to the basic/four program. President Raymond P. Kurshan noted that MAI anticipates that the new management team installed at Basic/Four Corp. during the latter part of 1973 would effect a turnaround in such operations in 1974.

Kurshan also indicated MAI had initially contemplated a

profitable fourth quarter primarily as a result of domestic sales of MAI's older equipment (which previously were credited to the residual value account). However, heavy losses from a Mexican subsidiary resulted in a fourth quarter loss of \$139,000 on revenues of \$18.9 million compared with a loss of \$5.3 million on revenues of \$13.9 million in the same period a year ago.

### Toward the Bottom Line

### 6-Month Earnings Up at Informatics

CANOGA PARK, Calif. — Informatics, Inc. reported increased earnings for the first six months of 1974. In the period ended Sept. 29, the firm posted earnings of \$612,000 or 36 cents per share. This compares with restated earnings of \$269,000 or 16 cents per share for the same period of the previous year.

Revenues were \$10.6 million compared with \$9.5 million a year ago.

Dr. Walter F. Bauer, president of Informatics, said the favorable operating results for the first half of the year were due to continuing increases in MARK IV File Management System sales and strong federal government business.

Bauer also noted the completed acquisition of Knowledge Networks International, Inc., a privately held Washington, D.C., company specializing in information retrieval, data base management systems and information systems for arbitration and mediation. The firm's annual revenues are approximately \$400,000.

Progress is continuing, Bauer added, in the development of a definitive agreement relative to the proposed acquisition of Informatics, Inc. by The Equitable Life Assurance Society of the U.S.

National Sharedata, the newly acquired Western Union subsidiary, signed five-year facilities management contracts with the Broadway National Bank of San Antonio, Texas, and the First Galesburg National Bank and Trust Co. of Galesburg, Ill., reportedly putting the firm ahead of its marketing goals for this year.

\$\$\$

Mathematical Applications Group's six-month earnings dropped to \$1,576 from \$21,469. President Phillip S. Mittelman attributed the drop in profits to changes-in-accounting procedures and heavy expenses associated with the introduction of the firm's Synthavision process. At the same time, the company's revenues rose 76%.

\$\$\$

Honeywell Finance, which finances customer obligations for Honeywell, is offering \$75 million of sinking fund debentures, due 1988. The underwriter is Blythe Eastman Dillon & Co., Inc.

\$\$\$

Vermont Research Corp. attributed its reduced annual income to an increase in R&D expenses for development of a moving-head disk product line and a decrease in drum sales resulting primarily from the mid-year loss of a major customer. The firm earned \$67,000 or 10 cents a share compared with \$790,000 or \$1.19 a share in the 1972 year ended Sept. 30.

The firm omitted the year-end dividend this year.

\$\$\$

Wang Laboratories has cancelled plans to offer \$20 million of convertible debentures in December. Wang said it will rely on existing bank credit and arrange additional long-term loans to finance product leases.

\$\$\$

Computer Sciences has sold \$5 million of its \$9 million of convertible debentures in Gilbert Associates, Inc. which were acquired in a sale of a subsidiary, Commonwealth Services, Inc.

\$\$\$

Granite Management Services' remaining debt of about \$3.5 million against its computer portfolio will be repaid by April 1974, when the portfolio will have a book value of about \$31.5 million.

\$\$\$

Cognitronics' OCR Division had a profit in the third quarter, but not enough to offset losses of the first two quarters which occurred when the company restated results to reflect charges of \$27,160 in the first quarter and \$22,141 in the second quarter on work in process. The amounts should have been charged to R&D as incurred.

In the nine months ended Sept. 30, corporate earnings totaled \$340,272 on revenues of \$3 million compared with a loss of \$991,637 in the 1972 period when revenues were \$1.6 million.

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## Earnings Reports

POTTER INSTRUMENT		
Three Months Ended Sept. 30		
	1973	1972
Shr Ernd	.....	.....
Revenue	\$11,358,350	10,733,596
Earnings	(350,685)	141,187

GENESEE COMPUTER CENTER		
Three Months Ended Aug. 31		
	1973	1972
Shr Ernd	.....	.....
Revenue	\$192,628	168,078
Earnings	33,965	15,039

INFOREX		
Three Months Ended Sept. 28		
	1973	1972
Shr Ernd	.....	.....
Revenue	10,287,000	6,140,000
Tax Cred	490,000	278,000
Earnings	854,000	525,000
9 Mo Shr	.95	.23
Revenue	27,142,000	15,796,000
Tax Cred	1,197,000	453,000
Earnings	2,572,000	535,000

COMPUTER TRANSCEIVER		
Six Months Ended Aug. 31		
	1973	1972
Shr Ernd	.....	.....
Revenue	1,920,900	1,307,100
Tax Cred	67,700	33,600
Earnings	154,500	81,400

INFORMATION INTERNATIONAL		
Six Months Ended Oct. 31		
	1973	1972
Shr Ernd	.....	.....
Revenue	4,567,252	3,491,189
Tax Cred	102,600	176,000
Earnings	599,002	380,488

DIGITAL COMPUTER CONTROLS		
Three Months Ended Aug. 31		
	1973	1972
Shr Ernd	.....	.....
Revenue	\$1,497,141	1,016,405
Spec Item	23,100	.....
Earnings	(45,862)	7,097
6 Mo Rev	2,722,013	1,580,058
Spec Item	43,000	.....
Loss	66,677	90,853

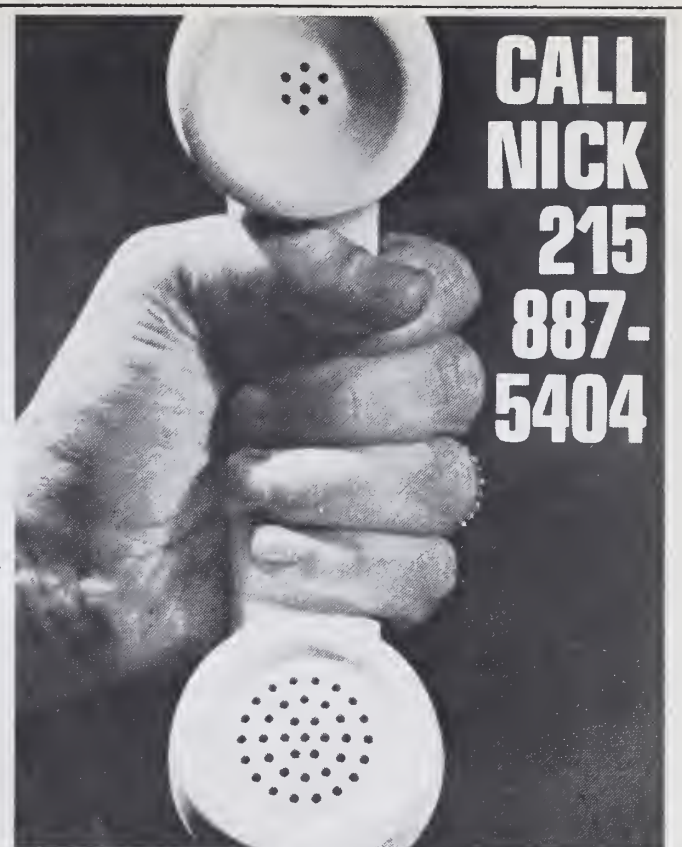
TELECREDIT		
Three Months Ended Oct. 31		
	1973	1972
Shr Ernd	.....	.....
Revenue	1,310,597	\$902,084
Tax Cred	52,200	.....
Earnings	113,622	(234,290)
6 Mo Shr	.14	.....
Revenue	2,564,254	1,866,906
Tax Cred	74,000	.....
Earnings	160,929	(316,453)

ELECTRONIC ASSISTANCE		
Three Months Ended Oct. 31		
	1973	1972
Shr Ernd	.....	.....
aRevenue	9,813,000	10,126,000
Disc Op	.....	(55,000)
Spec Chg	.....	1,000
Earnings	222,000	173,000
9 Mo Shr	.06	.....
aRevenue	27,692,000	28,087,000
Disc Op	.....	(151,000)
Spec Cred	.....	b14,000
Earnings	105,000	(127,000)

a-From continuing operations. b-Gain from sale of the property and plant of a business discontinued in 1970.

HEWLETT-PACKARD		
Year Ended Oct. 31		
	1973	1972
Shr Ernd	.....	.....
Revenue	663,129,000	479,077,000
Spec Cred	.....	a1,211,000
Earnings	50,704,000	38,461,000

a-Gain from change in method of valuing inventories.



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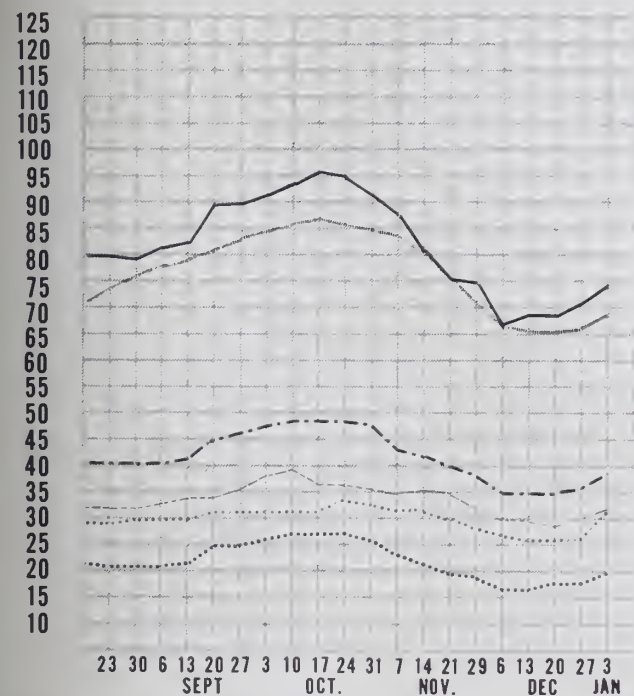
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## COMPUTERWORLD Computer Stocks Trading Indexes

Computer Systems      Software & EDP Services  
Peripherals & Subsystems      Leasing Companies  
Supplies & Accessories      CW Composite Index



TRADE\*QUOTES

## Computerworld Stock Trading Summary

All statistics compiled,  
computed and formatted by  
TRADE\*QUOTES, INC.  
Cambridge, Mass. 02139

COMPUTER SYSTEMS				
	1973	CLOSE	2-WEEK	2-WEEK
	RANGE	JAN 3	NET	PCT
	(1)	1973	CHNGE	CHNGE
N BURROUGHS CORR	18P-252	205	+6 1/8	+3.0
N COLLINS RADII	16- 26	24 3/4	0	0.0
O COMPUTER AUTOMATION	5- 20	14 1/4	+1 3/8	+10.6
N CONTROL DATA CORP	31- 62	35 1/2	+ 1/2	+1.4
O DATA GENERAL CORP	28- 49	34 1/2	+1	+2.9
D DATARDINT CORP	10- 21	14 3/4	+1 1/4	+9.2
O DIGITAL COMPTON CORP	2- 6	2 1/4	- 3/8	-14.2
N DIGITAL EQUIPMENT	73-117	97	+4 1/2	+4.8
A ELECTRONIC ASSOC.	2- 9	2 7/8	+ 1/2	+21.0
N ELECTRONIC ENGINEER.	6- 14	8 1/4	- 3/4	-8.3
N FDXRPO	23- 48	47 5/8	+5 1/4	+12.3
O GENERAL AUTOMATION	22- 55	33 1/2	+ 1/2	+1.5
O GRI COMPUTER CORP	1- 3	3/4	+ 1/4	+50.0
N HEWLETT-PACKARD CO	73- 99	81 3/8	+4 7/8	+6.3
N HONEYWELL INC	68-139	78 1/2	+5 1/8	+6.9
N IBM	238-340	239 1/4	-11 1/2	-4.5
O INTERDATA INC	7- 14	9 1/8	+ 3/4	+8.9
O MICRODATA CORP	2- 10	4	+1 1/4	+45.4
N NCR	27- 46	31 3/4	+1	+3.2
N RAYTHEON CO	22- 35	30 1/2	+2 1/2	+8.9
N SINGEE CO	35- 74	40	+4 1/2	+12.6
N SREPPY RAND	36- 56	43 3/4	+ 3/4	+1.7
A SYSTEMS ENG. LAPS	1- 8	2 1/8	+ 3/4	+54.5
N TEXAS INSTRUMENTS	83-138	107 1/2	+8 3/8	+8.4
O ULTIMATE SYSTEMS INC	1- 11	1	- 1/4	-20.0
N VAPIAN ASSOCIATES	10- 20	11 1/8	- 1/4	-2.1
N WANG LABS.	13- 34	19 1/2	+1 1/2	+8.3
N XEROX CORP	116-169	121 5/8	-5 7/8	-4.6
LEASING COMPANIES				
A ADDTHE COMRUTEP	1- 5	1 1/8	0	0.0
D RPESNAHAN CMDR.	1- 2	2	0	0.0
O COMDISC INC	4- 17	6 7/8	+1 3/4	+34.1
O COMMERCE GROUP CORP	3- 4	3 5/8	+ 3/8	+11.5
O COMRUTER EXCHANGE	1- 1	3/4	+ 1/4	+200.0
A COMRUTER INVESTS GPP	2- 8	2	- 1/8	-5.8
O COMR. INSTALLATIONS	1- 2	1	0	0.0
M DATPDNIC RENTAL	2- 3	1 1/8	- 3/8	-25.0
A OCL INC	0- 3	1/2	0	0.0
A OEARBOPN-STOMP	12- 26	18 1/8	+3 7/8	+27.1
N ORF INC	3- 9	4 1/4	+1 3/8	+47.8
O EDP PESOURCES	1- 3	3 1/4	+ 1/8	+4.0
A GRANITE MGT	2- 6	2 5/8	- 3/8	-12.5
A GREYHOUND COMPUTER	3- 6	3 7/8	+ 7/8	+29.1
A ITFL	4- 12	4 3/8	+ 3/8	+9.3
N LEASCO CORP	8- 18	10 1/8	- 1/8	-1.2
O LEASRAC CORP	1- 8	1 1/4	+ 1/8	+11.1
O LECTPO MGT INC	1- 2	1/4	+ 1/8	+100.0
O NPG INC	3- 15	4 1/4	- 1/4	-5.5
A PIONEER TEX CORP	4- 8	4 1/2	+ 1/2	+12.5
A ROCKWOOD COMPUTER	1- 3	7/8	+ 1/4	+40.0
N U.S. LEASING	16- 36	20	+2 1/4	+12.6

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH  
L=NATIONAL; M=MIOWEST; O=OVER-THE-COUNTER  
O-T-C PRICES ARE 810 PRICES AS OF 3 P.M. OR LAST 810  
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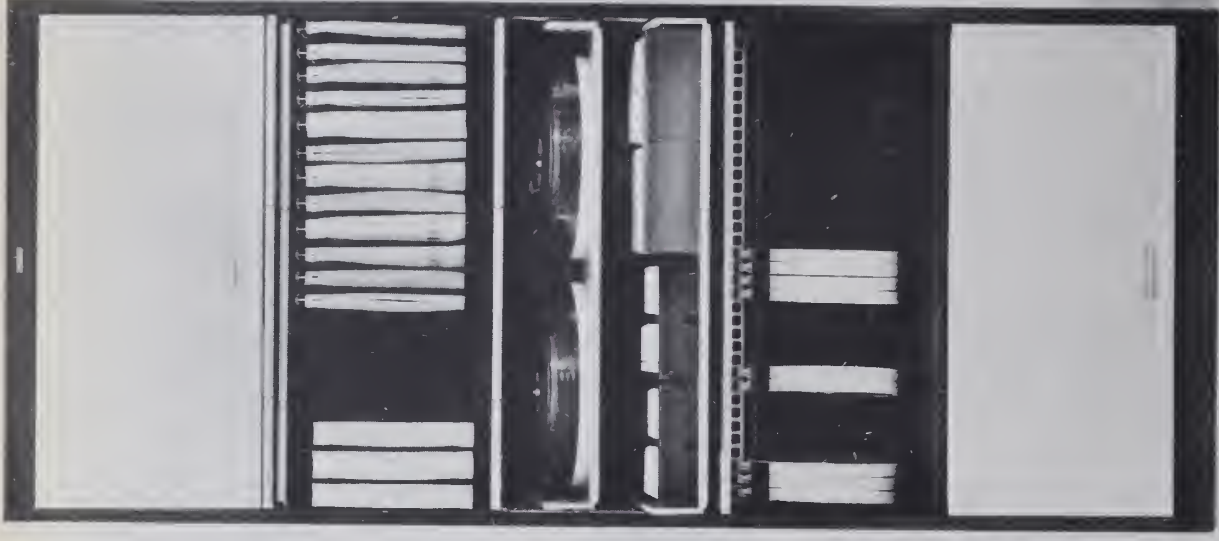
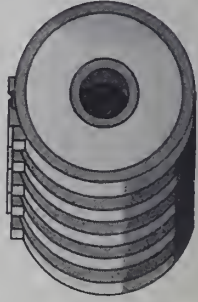
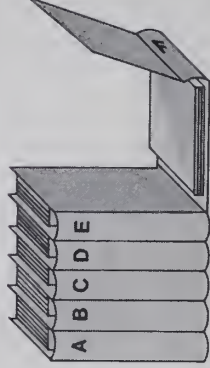
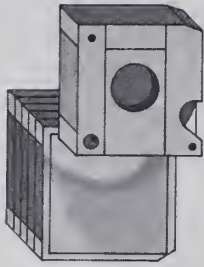
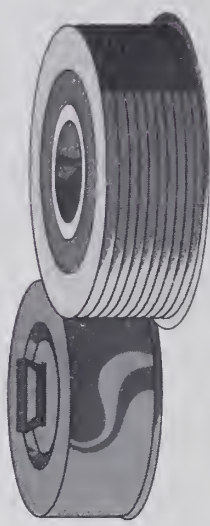
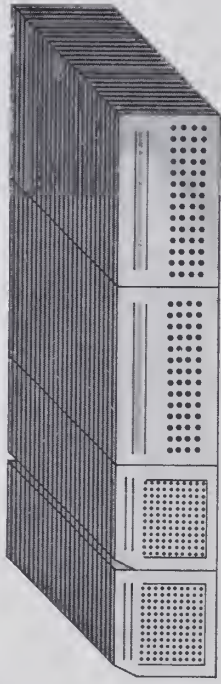
SOFTWARE & EDP SERVICES				
	1973	CLOSE	2-WEEK	2-WEEK
	RANGE	JAN 3	NET	PCT
	(1)	1973	CHNGE	CHNGE
D ADVANCED COMPT TECH	1- 2	1 1/2	+ 1/4	+20.0
A APPLIED DATA PES.	2- 4	1 7/8	+ 1/8	+7.1
O APPLIED LOGIC	1- 3	3/8	- 1/8	-25.0
N AUTOMATIC DATA RPOC	39- 94	56 7/8	+1 1/8	+2.0
D BRANDON ARRLIED SYST	1- 1	3/4	+ 1/4	+50.0
D CENTRAL DATA SYSTEMS	3- 9	3 1/2	+ 1/4	+7.6
D COMRUTEP DIMENSIONS	1- 5	2 1/4	+ 3/4	+50.0
O COMRUTEP DYNAMICS	1- 2	1/2	0	0.0
O COMRUTEP HOPIZDMS	1- 6	2	- 1/4	-11.1
O COMPUTER NETWORK	1- 5	1 1/4	+ 1/4	+25.0
N COMPUTER SCIENCES	2- 6	2 3/8	+ 1/4	+11.7
D COMPUTER TASK GROUP	1- 2	3/4	+ 1/4	+50.0
O COMPUTER TECHNOLOGY	1- 3	1/2	0	0.0
O COMRUTER USAGE	3- 9	3 3/8	- 3/8	-10.0
O COMPESS	1- 2	1/8	- 1/8	-50.0
O COMSHAPE	2- 9	2 1/4	+ 1/8	+5.8
N COPDUPA CORP	3- 15	3	0	0.0
O OATATAB	1- 4	1 1/4	+ 1/4	+25.0
A ELECT COMPT PPOG	1- 2	1/2	0	0.0
N ELECTRONIC DATA SYS.	20- 56	23 1/2	+1 3/8	+6.2
D INFONATIONAL INC	1- 2	1/2	0	0.0
D INFOMATICS	2- 6	5 1/4	0	0.0
O I.O.A. DATA CORP	1- 1	3/8	0	0.0
O IRS COMRUTER MARKET.	1- 5	7/8	0	0.0
O KEANE ASSOCIATES	2- 5	2 1/4	- 1/4	-10.0
O KEYDATA CORP	4- 12	5 1/4	+ 3/4	+16.6
O LOGICON	2- 7	2 1/8	- 1/8	-5.5
A MANAGEMENT DATA	1- 5	1 3/8	0	0.0
O NATIONAL CSS INC	18- 42	34	+9	+36.0
O NATIONAL COMPUTER CO	1- 1	3/4	0	0.0
D NATIONAL INFO SRVCS	1- 2	1/4	- 1/8	-33.3
P ON LINE SYSTEMS INC	12- 25	23 3/4	+ 1/2	+2.1
N PLANNING RESEARCH	2- 7	2 1/4	0	0.0
O PROGRAMMING METHODS	17- 25	17	0	0.0
O PROGRAMMING & SYS	1- 1	5/8	+ 1/8	+25.0
O PARIDATA INC	3- 24	5 3/8	+2	+59.2
O SCIENTIFIC COMPUTERS	1- 3	5/8	0	0.0
O SIMPLICITY COMPUTER	1- 4	1 1/8	- 1/8	-10.0
O TRS COMRUTER CENTERS	2- 9	8 1/2	+3 1/4	+61.9
O TCC INC	1- 1	1/4	+ 1/8	+100.0
O TYMSHAPE INC	6- 13	8 3/4	+1 1/4	+16.6
O UNITED DATA CENTER	3- 6	3 1/4	0	0.0
A UPS SYSTEMS	2- 8	3 3/8	+ 7/8	+35.0
N WYLY CORP	3- 11	3 3/8	+ 3/4	+28.5

PERIPHERALS & SUBSYSTEMS				
	1973	CLOSE	2-WEEK	2-WEEK
	RANGE	JAN 3	NET	PCT
	(1)	1973	CHNGE	CHNGE
N ADDRESSOGRAPH-MULT	9- 34	10 3/4	+1	+10.2
O ADVANCED MEMORY SYS	4- 23	4	0	0.0
N AMPEX CORP	3- 7	4	+ 7/8	+28.0
O ANOPESON JACOBSON	2- 6	2	+ 1/4	+14.2
O BEEHIVE MEDICAL ELEC	4- 10	4 1/2	0	0.0
A ROLT-PERANEK & NEW	6- 12	7 1/2	- 1/4	-3.2
N PINKETP-RAMO	6- 18	7 3/8	+ 3/8	+5.3
A CALCOMP	5- 16	9 1/8	+2 3/8	+35.1
O CAMPTOGIE MEMOIES	8- 17	15	+2 1/2	+20.0
O CENTRONICS DATA COMP	13- 38	18 3/4	+ 1/4	+1.3
O CODEX CORP	8- 19	10 1/2	+2	+23.5
O COGNITONICS	1- 3	1/2	0	0.0

		PRICE			
	1973	CLOS	2-WEEK	2-WEEK	
X	PANGE	JAN 3	NET	RCT	
H	(1)	1973	CHNGE	CHNGE	
O	CDMPUTER COMMUN.	1- 4	3/4	+ 3/8 +100.0	
A	COMRUTEP EQUIPMENT	1- 3	1 7/8	+ 1/2 +36.3	
D	COMRUTEP MACHINEPY	4- 13	4 5/8	+ 7/8 +23.3	
O	COMPUTER TRANSCEIVER	1- 6	1 3/4	+ 7/8 +100.0	
N	COMPAC COPR	13- 32	14 1/4	+ 7/8 +6.5	
O	DATA ACCESS SYSTEMS	1- 3	1 1/8	- 1/8 -10.0	
D	DATA 100	9- 19	11 3/4	+2 1/4 +24.6	
A	DATA PRODUCTS COPR	2- 5	3 1/2	+ 1/2 +16.6	
D	DATA PECGNOITION	2- 3	1 1/2	0 0.0	
D	DATA TECHNOLOGY	1- 5	2 1/4	+ 3/4 +50.0	
O	DECISION DATA COMRUT	6- 40	6 3/4	+ 3/4 +12.5	
D	DELTA DATA SYSTEMS	1- 1	3/4	0 0.0	
D	OI/AN CONTROLS	1- 4	1	- 1/2 -33.3	
N	ELECTRONIC M & M	3- 6	3 3/4	+ 1/2 +15.3	
O	FABRI-TEK	2- 5	2	+ 1/8 +6.6	
O	GENERAL COMRUTER SYS	3- 9	3 1/4	0 0.0	
N	GENERAL ELECTRIC	56- 76	63 3/4	+4 1/8 +6.9	
N	HAZELTINE COPR	4- 9	4 1/2	+ 1/8 +2.8	
O	INFOREX INC	3- 23	5 1/4	+1 3/8 +35.4	
O	INFORMATION DISPLAYS	1- 2	1/4	0 0.0	
O	INFORMATION INTL INC	8- 15	14	+3 +27.2	
A	LUNDY ELECTRONICS	3- 9	2 7/8	0 0.0	
O	MANAGEMENT ASSIST	1- 1	1/4	0 0.0	
N	MEMDFFX	2- 19	2 1/8	- 3/8 -15.0	
A	MILGO ELECTRONICS	14- 28	15 5/8	+ 5/8 +4.1	
N	MINOMAX DATA SCI	2- 13	2 3/8	+ 1/8 +5.5	
O	DDEC COMRUTEP SYST.	2- 6	2 5/8	+ 1/4 +10.5	
O	OPTICAL SCANNING	2- 6	2 1/2	- 1/4 -9.0	
O	PERTEC COPP	3- 8	4 3/4	+1 3/8 +40.7	
O	PHOTON	3- 7	3 3/4	0 0.0	
A	POTTER INSTRUMENT	2- 9	3 5/8	+ 7/8 +31.8	
O	PRECISION INST.	2- 6	1 1/2	- 1/4 -14.2	
D	QUANTOP CORR	5- 10	4 3/4	- 1/2 -9.5	
O	PECGNOITION EQUIP	2- 6	2 1/2	+ 1/4 +11.1	
N	SANDERS ASSOCIATES	6- 18	7 1/4	+ 1/8 +1.7	
O	SCAN DATA	1- 6	1 3/4	- 1/4 -12.5	
O	STORAGE TECHNOLOGY	11- 34	14	- 1/4 -1.7	
O	SYCOP INC	9- 20	10 3/4	+ 3/4 +7.5	
D	TALLY CORR.	2- 14	2 1/8	+ 1/2 +30.7	
O	TFC INC	5- 9	6	+ 3/4 +14.2	
N	TEKTRONIX INC	30- 55	42 1/2	+ 3/8 +0.8	
N	TELEX	3- 13	3 1/4	+ 3/8 +13.0	
O	WALSCO INC	7- 13	8 7/8	+ 3/8 +4.4	
O	WILTEK INC	7- 18	8	+ 1/4 +3.2	



# **Tab makes** **one storage cabinet** **for cards,** **one for disks,** **one for microform,** **one for binders,** **one for printouts,** **and one for tapes.**



## **This one.**

The Data Media Cabinet. Since 1956 when Tab introduced it, this revolutionary cabinet has quietly become a computer room word in media storage. With its broad selection of shelves, inserts, racks and rollout trays, it has readily and easily adapted to provide safe storage for 80 and 96 column cards, microfilm rolls and cartridges, fiche, mag tapes, disc packs (2315, 1316, 2316, 3336, 5440), printouts, manuals, binders, forms in cartons; even the department coffee

pot. Others have tried to improve on it. But the two-, three-, four- and five-compartment Tab Data Media Cabinet has proven unbeatable over the years. Unbeatable still. One of its many configurations will meet your precise storage requirements, even as one of its many colors will complement your office landscape or computer room environment. Contact your local Tab representative, or write Tab Products Co., 2690 Hanover Street, Palo Alto, Calif. 94304.

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